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AMERICAN GAS ENGINEERING JOURNAL

FORMERLY

AMERICAN GAS LIGHT JOURNAL

VOL. CXI., No. 16
WHOLE No. 3215

NEW YORK, SATURDAY, OCTOBER 18, 1919

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By-Product
Coke Plants
THE size and number of by-product coke plants in this country has increased enormously during the last few years and must continue to increase at an even greater extent in the future. These plants require very large quantities of Cast Iron Pipe for handling the gases from the ovens, the coal tar and oils produced by the condensation of these gases, for handling the solvents used for the extraction of benzol and toluol, in the scrubbing towers and, finally, for the large volumes of water required for cooling the various condensers which form such a large part of such plants. The illustrations on this page are from the plant of the Seaboard By-Product Coke Co., Kearney, N. J.
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American
Gas Engineering Journal

FORMERLY THE AMERICAN GAS LIGHT JOURNAL

Vol. CXI, No. 16 NEW YORK, OCTOBER 18, 1919 Whole No. 3215

American Gas Association Establishing a Tradition for Attendances Much in Excess of the Expected

Fact that They Are Succeeding to a Greater Degree in Arousing the Gas Man's Interest in Their Works and Proceedings Than They Had Permitted Themselves to Believe Was Accountable for the Fact that Attendance Planned for at the Annual Convention and Attendance that Materialized Were Different Things Entirely

The gas man is giving the arrangements committee of the American Gas Association a difficult task in attaining that degree of comfort and convenience at conventions that will justify our alert and ever-accurate contemporary, the *Monthly Bulletin* in alluding to them as the acme of perfection.

At the March conference few were expected, but for those few an almost extravagant amount of auditorium space was provided.

The few materialized into a small-sized horde. People were standing almost throughout the session.

We can imagine our committee on arrangements smiling up its collective sleeve when it viewed, previous to the show-down, the especially spacious auditorium provided by the Hotel Pennsylvania for the first annual convention.

Then the attendance began to materialize.

Our time-tested friend, George G. Ramsdell, prominent behind the registration counter, was visibly delighted. Several years of secretaryship of the institute has had the effect of engendering in Mr. Ramsdell's mind a high degree of appreciation for big attendances.

Frankly, Mr. Ramsdell likes big attendances. When they are in connection with a gas association convention he views them as in themselves an achievement, which inclines us to the view that various political organizations have overlooked something when they overlooked Mr. Ramsdell on registration day. He likes to see them gotten out.

The attendance continued to file in. Mr. Ramsdell's eyes betrayed an increasing degree of elation. But they did not carry beyond the doors of the auditorium. But those of the committee on arrangements must have, and the editor of the aforementioned *Monthly Bulletin* was seated on the platform.

Very early in the morning it became very evident, indeed, that the seating capacity of the auditorium was by no means sufficient. And the worst was still beyond.

Seated at a point of vantage, where he could to best advantage count the admissions, Will W. Barnes was having his own disquieting moments.

Inclined to a degree of complacency, because though delayed unavoidably in getting possession of the exhibits hall space, Mr. Barnes was very promptly becoming enlightened as to the fact that his aisles were not wide enough to accommodate the groups desirous of traversing them both ways and congregating in them to reminisce.

And the major part of this additional throng was yet to be accommodated in the auditorium.

What a test for the editor of the *Monthly Bulletin*. It is true that this estimable periodical once styled a Manila cigar factory as a *Cuban* cigar factory, but this was a question of geography, and, perhaps, trade usage —all of us knowing that perhaps as many "clear Havanas" come from Tampa and Connecticut as come from Cuba.

But the attendance and its preponderance over the space available was there for the eyes to see, likewise the eyes of the editor of the *Monthly Bulletin*. And the *Bulletin* is never knowingly inaccurate.

Its editor is a particular friend of Mr. Barnes. He is doubtless a friend of the committee of arrangements, and, perhaps, even was one of its important instrumentalities.

Strict accuracy will not permit him to pronounce the arrangements either as to the auditorium space or the exhibits the acme of perfection. And here's an additional secret. They had to stop the sale of tickets to the banquet long before that event took place.

The best he can say is that the arrangements were as perfect as the reasonable expectations, perhaps stretched to a considerable degree, could have provided.

And words such as these are strange indeed to the vocabulary of the gas journalist.

These people who are handling the affairs of the American Gas Association have undervalued their own accomplishments.

Their works and proceedings are arousing interest and enthusiasm among gas men to a vastly greater degree than they have imagined.

Doubtless they made their arrangements on the basis of old standards with a liberal factor of safety. Perhaps, too, they took into account the apparent deficiency in active membership. And they have been caught short twice.

Old standards count for nothing. This is a new kind of association and the gas man has sensed it.

He knows the sessions will be alive with interest and big things, and that is why he comes to conventions in numbers hitherto unknown.

So he came to the March conference; so he came to the first annual convention, and so he will come to future conventions so long as the American Gas Association continues to manifest the high ideals of inspiration, the sense of being on the job, the alertness and the real value that has characterized it up to the present time.

The weather the first day was all it should not have been. It was wet, sultry and generally unpleasant.

The attitude of the gas man was appreciative, responsive and enthusiastic.

A fact that stood out prominently was the attitude towards the association's president, Mr. Cortelyou.

We have had popular presidents of gas associations before. but here was revealed a popularity that required study to analyze.

There was a tendency to noisy applause at every opportunity, however slight, that was offered. A mere word, a phrase, an anecdote, was sufficient to start hands to clapping.

The demonstrativeness of the convention was in decided contrast to the attitude of its president.

He was quiet spoken, though his words reached every corner, and quiet, smooth and unemotional in his conduct of the proceedings.

It would be mere evasion to attribute this popularity to the magnetism of the man. This exists, but other association presidents who have not inspired such eruptions as greeted Mr. Cortelyou have also been possessed of personal magnetism.

A correct interpretation, the writer believes, is that the field senses that its national association president, though the office carries no compensation, is taking his job like a hired man.

He is working.

And he is succeeding.

In applauding him the field is expressing its goodwill, its appreciation of the constructive and active good-will Mr. Cortelyou is demonstrating towards it. The gas man, a giver of service, knows what he is getting when service is given to him.

Vehemence is added to the applause thus drawn forth by the self-satisfaction the gas man feels at having a man so uniquely qualified for his great task, possibly the greatest in the history of the gas industry, available within his own ranks at the time of need. When he shouldered the task of establishing on a sound footing, and for permanance, the American Gas Association, on the shoulders of George B. Cortelyou, the gas man realizes he made a superb selection, that he has played in supreme luck.

Another who stands well with the gas man, as manifested towards him at the convention, is Col. Oscar H. Fogg.

In this case we deal with a salaried officer.

The salary is large, but by no means out of proportion to the task.

It is one thing to set a high salary. It is quite another thing to find a man worth it.

The gas man evidently feels that Colonel Fogg fills the bill; in fact, does somewhat more, for it is evident that the industry feels that he has something more due him than the money provides.

The comparative paucity of active memberships, as revealed by P. C. Young, was a source of surprise.

Even an unfriendly critic would not say that what previous national associations had to offer was as anything as compared to what this association offers.

It would seem that many do not realize a truly valuable agency towards things better when it is spread out before their own eyes.

The AMERICAN GAS ENGINEERING JOURNAL feels no responsibility towards the upbuilding of the membership of the American Gas Association, save that that which is for the good of the gas industry is for the good of all of us.

But a failure to take advantage of the lifts to things better that membership in this different kind of a gas association provides, is really a reflection on the personal sagacity of the individual gas man who has failed to avail himself of it.

The financial condition of the association is sound. It has big costs to meet, but apparently it is experiencing no difficulty in finding the funds to meet them with. It is now possessed of some fifty-five thousand dollars in assets as against some four thousand five hundred dollars in liabilities.

During the presidential address Arthur Hewitt presided in the absence of C. L. Holman, the vice-president, who was kept away by illness in the family.

The amendments to the constitution, offered by W. J. Clark, which have been widely published, were adopted without dissenting vote.

Mr. Cortelyou was enthusiastically elected president for the forthcoming year. Rufus C. Dawes was elected vice-president and W. H. Barthold treasurer.

Charles A. Munroe presented the report of the nominating committee.

W. H. Gartley's paper on the "Chemist in the Gas Industry," took the place of Mr. Doherty's on the first day's program.

Mr. Doherty at the time was in the midst of a three-day trip to get to the convention and outrage the sensibilities of quite a number of those present.

It is common knowledge that Mr. Doherty has views of his own. Also that he is not diffident about expressing them.

He has run counter to the viewpoint of gas men before. And time has shown that he—Mr. Doherty—was right. He was simply ahead of his time.

But Mr. Doherty was not going to be permitted to get by with a lot of next-century stuff at this convention, simply on the grounds of what the records show.

He was compelled to "argufy" probably to greater length than any other speaker at the convention.

The technical session, Tuesday afternoon, crowded

until it closed, and the attention gradually became tense and concentrated.

J. B. Klumpp, section chairman, opened this first session with an address in which he strongly urged the association to go after and arouse interest in the younger men of the industry. He recommended that the association appoint two new committees, a committee on fuel, to make an exhaustive study of the fuels of this country, and a committee to investigate gas oils. He said every effort should be made to make gas the pre-eminent source of fuel.

At this session L. R. Dutton was elected chairman of the section for the coming year, and Warren S. Blauvelt was elected vice-chairman.

A. H. Harris, Jr., read a paper on "The By-Product Coke Oven and Its Place in the Gas Industry."

Mr. Harris' paper lead to a great deal of discussion. Pertinent facts regarding coal brought out by Mr. Harris were that coal is each year found deeper in the ground, and that the percentage to get out is lower and lower each year, and that the percentage of ash is increasingly higher.

The increase in the by-products of coal was discussed and the conditions confronting the by-product industry. The discussions led to the conclusion that it was not at all an easy problem, but a very difficult one and that the by-product industry will lead to a great change in domestic heat.

Mr. Klumpp tried very hard to lead the discussion to the by-products of gas, from the gas man's point of view. Not much discussion ensued, however, along this line.

At this session a lively discussion took place regarding changing from coke oven gas to coal and water gas. Experiences which occurred in different cities in changing were related and were at great variance.

In one case it was related that a change from 50 per cent coke oven gas to water gas, and then changing again to 35 per cent coal gas without attracting any notice or complaints from consumers.

One experience was related in changing from coke oven gas to water gas, which in this case it was necessary to make very suddenly. He said that practically every appliance in the city was thrown so badly out of adjustment that it was almost impossible to use it, and that it was not possible to make all the adjustments asked for. Not until coke oven gas was restored, was there any satisfactory gas service.

An experience in St. Paul, Minn., was told of where they changed from coke oven gas. The change was made over a period of about two weeks, and the results were not so serious as some others related, as none in the city found it out. This seemed to cause much merriment.

On Thursday afternoon the closing session of the technical session reports were read of the committees on electrolysis and chemical, after which followed a discussion of high and low pressure and possibilities of pressure control. There were no new or unusual points brought out in this discussion.

Charles R. Henderson's paper on "Dust Deposits in Mains and Services" created much interest, and some of the men present stated that they had never given this subject any thought, but that they expected that soon they would probably be faced with the problem.

Mr. Cortelyou addressed the session. He said that he is eager to draw on the younger men in the industry for committee work. He said that he not only wanted to see the younger men of the industry serving on the committees of the association, but that all companies should list men, and especially the younger men of the industry, for the association to call upon for committee work. Mr. Cortelyou said that the association is aiming to render a general and effective service to each, individually, and to the industry at large.

L. R. Dutton, the new chairman of the technical section, spoke for a few moments and said that already there are many suggestions of importance for enlarging the field of work which will call for a larger task and a larger working personnel. Mr. Dutton said that this convention meeting has set the horizon further back, and as that horizon is set further back, so much harder must we devote ourselves to the task. He said the work done in the last year has blazed the Indian trails which later became the grand highways. He said we should make more definite the things we are trying to standardize, and that now is the time to make broader the highways along which we are to travel in our endeavor.

The technical sessions were held on three days, Tuesday, Wednesday and Thursday. They were more than well attended all three meetings. They were, in fact, crowded, and a live interest continued all through. Discussions were easily started and the men were enthusiastic in their response. In smal lgroups that gathered together after the meetings, in passing by, one heard much satisfaction expressed. The large attendance also was spoken of, generally, by the men themselves.

C. A. Munroe, vice-president of the Peoples Gas Light & Coke Company of Chicago, read an industrial paper on the "Unsold Market for Gas" at the general session, Wednesday. The principal discussion brought up by this paper was the need of central laboratories. This subject took up considerable attention at this session, and the benefits to be derived from a central laboratory under the association was unanimously agreed upon. A suggestion was put forward that an amount of $50,000 a year for maintenance should be secured, and it was agreed upon by different men present that this amount could be readily obtained for the purpose. Mr. Cortelyou expressed his interest in this project, and in the general feeling that the association could get the money for the laboratory. There was a formal motion made and carried for prompt and proper action to be taken.

Also some direct discussion on Mr. Munroe's paper on the unsold market for gas followed. The general feeling among the men seemed to be that there are so many unsold markets for gas it would take too long a time to enumerate them. Practically every man present admitted that the big field is the industrial field.

James P. Hanlon, speaking in the discussion, very forcibly stated that there is not a customer who cannot use at least, and have a legitimate need for $3 worth of gas a month. Mr. Hanlon said that he believes the great unsold domestic field is water heaters, and that this is the greatest unsold volume business in the country, and, further, that it will double and will balance the greater volume of industrial business we are getting.

The Thursday morning meeting of the general session was probably the banner meeting of the convention from the standpoint of general interest. It was attended almost to a man. It was a long session, lasting from 10 a. m. until 1.30 p. m., but the interest did not decrease.

N. C. Kingsbury, vice-president of the American Tele-

phone & Telegraph Company, read his paper on the "Influence of Publicity in Establishing Relations Between Utilities and the Public." It was an excellent presentation, and it was very evidently heartily appreciated by the audience. Immediately after Mr. Kingsbury's address, George Williams, chairman of the Advertising Section of the American Gas Association, read his report on the plan and scope of this section of the association.

Joseph H. Choate, Jr., counsel for the Chemical Foundation, was introduced by Mr. Cortelyou. Mr. Choate addressed the meeting for the purpose of asking the support of the gas industry for the passing of a bill for legislation, now before the Senate, for the protection of the dye industry. He made a strong appeal, in which he clearly told of the importance of the coal tar products, which makes close allies of the chemical and gas industries.

Mr. Ramsburg, following Mr. Choate's address, moved that each member individually and the association as a body, send an appeal to Washington for the passing of this bill, which it is understood is being held up by Senator Penrose until after the signing of the Peace Treaty.

Henry L. Doherty was present and moved an amendment to the motion—that the association wait until it could look into carefully and study over this bill, known as Bill No. 8078, and decide for itself how nearly interested the gas industry is in the measure. Mr. Doherty said that for so long the gas industry has been fighting other people's battles to their own neglect, and that often such action has come from appeals made at just such gatherings as this one. This brought about lively and heated argument, and the chairman found it necessary to use his gavel heavily and frequently during this decussion.

Mr. Doherty held to his point, however, and was decidedly opposed to any immediate and hasty action on the part of the association in this matter. Mr. Addicks asked if Mr. Doherty knew of anything in the bill that would affect the gas industry adversely. Mr. Doherty replied he did not at all know what is contained in the bill, and it was the policy of hasty actions without having studied the question and knowing how it would relate to the gas industry, and that he was opposed to seeing the association putting itself down for any action in this manner. Mr. Cortelyou, presiding at the session, appointed a committee to look into the bill, a copy of which one of the men present held, and report back some decision in forty-five minutes. A committee of three was appointed, namely, W. R. Addicks, Roland Norris and C. A. Munroe. In forty-five minutes the committee of three reported back and Mr. Addicks read its decision, the gist of which was that the legislation was very incolved and could not possibly be looked into in the time allowed and the action on it should be referred to the board of directors of the association.

Mr. Doherty read his paper, "What Are the Needs of the Gas Industry?" following the discussion of the coal tar bill. He remarked that he came to criticize, but to constructively criticize. He said for one thing he wanted to see a democratic association—even a more democratic one than it is. He believed a big effort should be made to get the young men to participate in its work, even to the young and bumptious ones. He said, however, there was one thing he hoped would get over at this convention, and that is that the gas business is a legitimate business—not a "speak easy," although one might think it was a "speak easy" from the way it has been run in the past, and the apparent fear on the part of the companies to come out and say what they are doing. Mr. Doherty said men in the industry should impress themselves with the fact that they are furnishing a service—that they are ready to serve the public at all times—and it costs them money to be there at all times ready. That all companies should maintain a service charge. To impress this idea, Mr. Doherty pointed out that in spite of the fact that the gas company is always ready to serve twenty-four hours of the day, the average monthly gas bill amounted to one-sixth of a man's average day's wage, and that this necessity should be paid for more in proportion to what the service is worth to the public. That this service is well worth more than a sixth of a day's wage. He also advocated a standard odor for all kinds of gas. That when that standard odor is smelled, the consumer will know it is gas, but not the kind of gas it is—natural or any other kind.

Mr. Doherty closed his discussion with saying that it seems to him we are in a fundamentally economical environment. He asked all to think what has been done to modify that environment, so as to use the service we have. One thing he suggested that has not been done, that it is more economical to gasify all our coal, than it is to send coal two or three miles farther to generate electric current.

Mr. Cortelyou closed the session. He expressed his appreciation of the splendid attendance. He said that message of good cheer will go out to all the industry from the convention. He said the American Gas Association is facing forward and is alive to the needs of the industry, in meeting which it will endeavor to give thorough and effective service.

Commercial Section

E. W. Wrightington, section chairman of the commercial section, opened the first meeting of this section.

H. K. Dodson read a paper on "Sales Campaigns." This led to considerable discussion regarding means to stimulate buying. R. R. Young urged the necessity of planning sales campaigns a year in advance. Mr. Young also brought up the subject of price cutting, which received much discussion pro and con, some of the men believing it to be bad policy to reduce the price during a campaign because it would create a tendency on the part of the public to hold off buying and waiting for the reduction, no matter how long off it should be. Mr. Dodson said he believed in set prices, because the set price makes for confidence in the people. Mr. Young brought up the subject of the use of the telephone in advising people of special prices, and that it had been found an effective means of making a large number of sales.

C. A. Munroe, of the Peoples Gas Light & Coke Company, brought out the point that there is need to get more devices into the houses of consumers who are only buying $1.50 worth of gas a month. More gas devices should bring these consumers out of the unprofitable class into the profitable class. Mr. Munroe said that these $1.50 consumers have need of and can use to advantage more gas.

Mr. Dodson's suggestion for a plan of sales campaigns is to have a special campaign of one appliance

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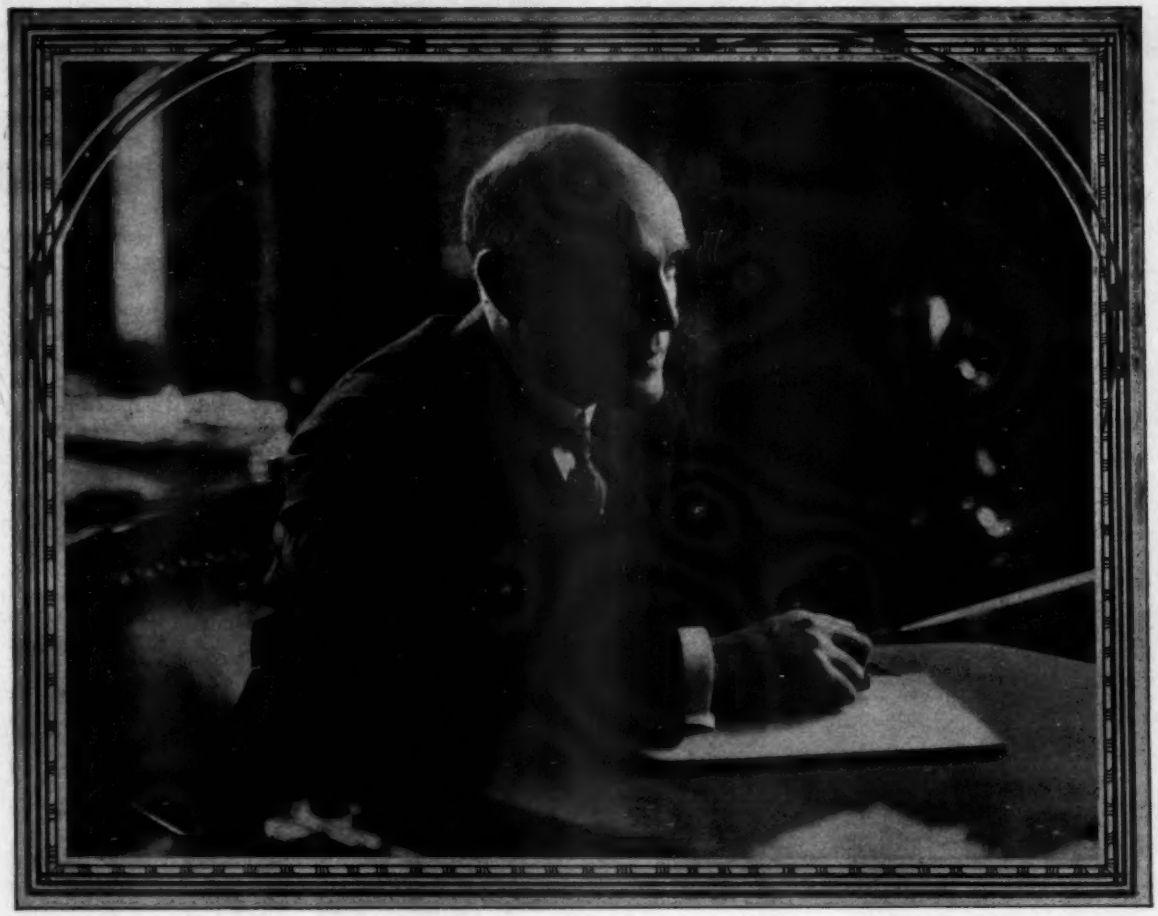

Can Be No Market for Utility Securities Until Satisfactory Credit Standing Is Restored

Francis H. Sisson Lays Down Four Essentials to Accomplishment of Such End—Enlisting the Community Interest

The seriousness of the public utility problem was given official Government recognition some months ago when the President mentioned it in his message to Congress as one of the most pressing problems before the country. The difficulties that public utilities have encountered in the last few years are matters of common knowledge in financial circles, but, unfortunately, they do not seem to have been understood as widely by the general public as they should have been, declared Francis H. Sisson, vice-president of the Guaranty Trust Company of New York, in an address before the convention of the American Gas Association.

As a result of the President's remarks, a Federal Electric Railways Commission was appointed to find a remedy for the ills of the street railways, which are undoubtedly in the most unfortunate position of any of the public utilities, with artificial gas companies a close second.

The utilities have been ground between two millstones. They have had to contend with wages and prices of materials increasing by leaps and bounds on the one hand, and on the other with a more or less stationary return for services rendered.

The situation was ameliorated to some extent for the railroads and for the telegraph lines by Federal operation, combined with a Government guarantee of earnings; for the express companies by a Government guarantee against losses; and for many manufacturing concerns obliged greatly to increase their facilities, by arrangements for amortization of the cost of this extra construction through Government payments. The street railway that carried the men who labored in the fac-

tories, and the power company that furnished the power to keep many of the factories running, were, however, left to get along as best they could on the steadily shrinking margin between operating costs mounting higher and higher under the control of world conditions, and income mounting very slowly, if at all, under the control of numerous public officials.

Funds Obtainable Only on Receivership Terms

Regulating bodies have been reluctant to grant increases in rates in any degree commensurate with the increases in prices and wages, and in many cases no increases in rates whatsoever have been permitted. Not only have regulating bodies stood in the way of an adequate return, but in numerous instances franchise restrictions on rates have had to be contended with. In too many cases public officials, supported by an uninformed and frequently by a perhaps purposely inflamed public opinion, have refused to consider the need for revision of franchise restrictions. They seem to ignore the fact that these maximum rates were written into the franchises in periods of more or less static prices, and that when a price upheaval, such as that occasioned by the war occurs, and reduces by 50 per cent the purchasing power of money, there should be, in all justice, such a revision in franchise restrictions as would enable the utilities to cope with the new conditions. Instead of taking a broad-minded position, many municipal authorities, in the words of Mr. Edison, "choose to take their pound of flesh," forgetting what the future penalties of their action may be in the way of decreased service.

From the financial standpoint, the net result of this attitude on the part of public officials has been not only that public utilities have had to pay the higher interest rates general in the war period, but also that, as the business became less and less attractive to investors, the price that these companies had to pay for funds was relatively higher as compared with other lines of business. To-day many public utility corporations can obtain money practically only on receivership terms, and then with difficulty.

Perhaps as forcible an illustration as could be given of this relative decline in public utility credit is afforded by a consideration of the position of ten high-grade railroad bonds, ten second-grade railroad bonds, ten public utility bonds and ten industrial bonds. As compared with a year ago—about the time when the fourth Liberty Loan was being floated—the average prices of the other three classes showed increases ranging from 0.64 to 1.98, but the average of the ten utility bonds was down 2.35.

Such a situation can have no other effect than to discourage the investment of new capital in the business. New capital is essential from time to time if the big public utility companies are to continue to give adequate service or, in fact, any service at all to the communities in which they operate. We have only to recall the bankrupt state of the traction system in this city to realize that.

Resuscitating Utility Credit

And this brings us logically to a consideration of the measures that are necessary to restore the former high credit status of the utilities, in order that they may function properly and full, and do their vital part in maintaining the health and efficiency of our whole economic body. There can be no market for public utilities, in the true sense of the term, until such credit standing is restored.

First, it is necessary that the public and the municipal authorities be made to realize the difficulties of the utilities, the injustice of their present position, and the necessity of increased rates for service rendered. Until the public appreciates the true aspect of affairs, it will be possible for demagogues and politicians to misrepresent the state of affairs, using the plight of the utilities to further their selfish ends.

Second, regulating bodies must adopt a broader and more flexible rate regulation policy. Rates must be allowed which will afford adequate return on money invested regardless of the maximum rates specified in franchises and contracts agreed to years ago. Regulating bodies must also indicate a willingness to make a prompt adjustment of rates as soon as it becomes apparent that the existing schedule is inequitable. In too many cases in the last few years have proceedings with reference to applications for increases in rates dragged on interminably.

Third, a stabilization of labor conditions is needed, and a cessation of demands for exorbitant wage increases over the already existing high level of wages.

Fourth, the fear of the bogie of public ownership must be removed. Rights of property in public utilities must be so firmly established that the investor need have no fear of having his savings confiscated, in any part, even should the municipality ever take over his company.

Enlisting Community Interest

The communities which are served directly by public utilities should supply the largest number of owners of the securities of such corporations whenever and wherever feasible. Thus the property would be owned by those who would be keenly interested not only in the security and certainty of returns on their investment but also in seeing that proper and adequate service was rendered to the community. It has been advocated, and logically, I believe, that such a body of security-holders would see to it that the property had a management that recognized and was able to administer not only the profit-making aspect of the job but also the public service aspect as well.

But underlying the entire public utility situation and the question of recreating a market for public utility securities is the necessity for determining the real value of each property and the fixing of a satisfactory return thereon. It has truthfully been observed that "except in some isolated cases, we have no such plan of procedure to-day. Valuations and capitalizations usually are simply what they happen to be. Even when fixed judicially or determined by quasi-public agencies like State commissions, they seldom have a patent for accuracy or equity. Where they have been fixed by politicians, or that elusive thing called public opinion, they have usually been ungenerous and unfair. Where they have been fixed by unrestrained action of the companies, they have been all that the traffic would bear. In any event, they now generally appear as a misshapen thing that has grown and expanded mushroom-like in periods

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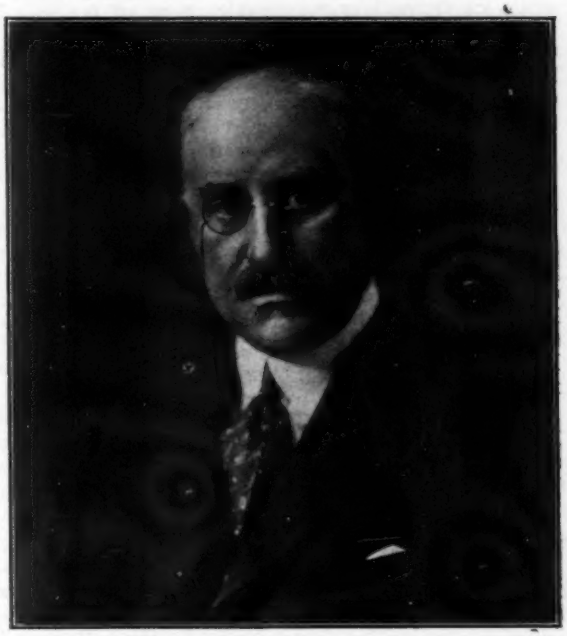
In National Advertising State the Facts—Tell the Truth and Let the Consumer Form His Own Opinion

N. C. Kingsbury Tells How Campaign Planned to Be Entirely Educational Benefited and Increased the Business of the American Telegraph and Telephone Company

The real underlying cause for all the unrest and discontent, which is in turn the cause of present social and business conditions, is ignorance—ignorance of the other fellow's problems, selfish lack of appreciation of his difficulties, and consequent lack of sympathy with any other business or class, asserted N. C. Kingsbury, vice-president of the American Telegraph & Telephone Company, in an address before the American Gas Association convention. The people of this world need to get to work, each at his own job, and at the same time to consider that the other fellow has a job with certain inherent rights.



A Fuller Revelation of the Policies of the Business.

In order to dispel this ignorance, there is, in my opinion, the need for fuller revelation of the policies of *your* business, of the ideals which *you* pursue and the products which you have to sell. You cannot expect cordial co-operation unless the people with whom you have business relations are well advised with respect to your policies and your products. In my opinion the public service corporations of this country have in the past been too reticent with respect to their affairs.

No line of business endeavor has shown greater initiative or assumed greater business risks in the settlement and development of the United States than the so-called public utility companies. Nearly one-fifth of the total wealth of the United States is invested in the business of furnishing transportation, light, heat, power, water, gas and telephone service. This is an investment well worth conserving. Indeed, if the public service corporations of this country are not to be successful; if the twenty-eight billions of dollars representing the investment in these lines of business do not have a real, definite, permanent earning power, it is absolutely certain that the earning power of the balance of the investments and wealth of the United States will be greatly impaired and general good times in business will be impossible.

Permanent Success Impossible Without Favoring Public Relations

To you men experienced in the gas business the fact must be apparent that, in order to make even a small margin of profit, it is necessary to have conditions very favorable. And I believe that no matter how favorable other conditions may be, if your relations with the public which you serve are not what they should be any accurate or permanent success is absolutely impossible. Indeed, I would go a step farther and affirm that if a public service corporation is to-day making money to the detriment of the public it serves, that condition will be short-lived at the best; and as a hopeful corollary, a public service corporation which is not making money, and which is treating the public it serves honestly and fairly, may with confidence look forward to a better day and ultimate success.

I think we might as well admit that, in general, the relations between the public and the public service corporations are not just what they should be. I am reminded of the remark of the gentleman who, when he was asked in regard to his Christmas gifts, stated that he was making no presents this year, as his relations were either dead or strained. Now, whatever may be said of our relations with the public, they are not dead but they are often strained.

So far as the corporations are concerned, it is my belief that there has been a great change in their attitude toward the public during the past few years; and one of the great problems, if not the greatest, of the business is to bring about a corresponding change in the attitude of the public. *This is one great function of national publicity.*

But all companies have not accepted the new theory of obligation to the public in all matters concerning it as fully and as quickly as the public and public authority have required them to do, and this has caused a good deal of friction. Publicity is the surest and quickest cure.

Harmfulness of Obstructive Tactics

There has been a tendency to resist any improvement in the laws concerning the business. The lobbyist of the public service corporation was long a familiar figure in legislative halls, and a great deal of permanent harm resulted from the obstructive tactics that some of the companies followed whenever any progressive legislation was attempted.

I appreciate the fact that in many cases demands have been for refinements and improvements which, while in themselves reasonable, were so far in advance of the financial ability of the companies that they were practically impossible of accomplishment. In all such instances my opinion is that a frank statement to the public and the lawmakers of the exact financial conditions will receive just consideration. In any event, there is no question but that the old method of blind opposition and intrigue was a mistake.

These are but a few of the many causes which have combined to bring about a relation between the public and the companies serving the public which we all deplore, and which we all earnestly desire to improve. How can we do it? That is the question. A great many different things have been suggested. Time permits of a discussion of very few of them this morning.

I am by no means overlooking the first great obligation of every public utility company to give the very best service possible. That is the one reason for the existence of the business. I am assuming that this paramount duty has been recognized and met. Argument here is not necessary along that line.

In the first place, I think the public service corporations should all get together. In all matters which have to do with relations between the corporations and the public there should be the fullest and most cordial co-operation. We have a common cause. The gas company, in the very nature of things, when it adopts a policy which pleases the public helps the telephone company operating in the same territory; and when the telephone company offends the public, and thereby injures its own public relations, it also injures the public relations of the gas company. The public does not clearly discriminate between the different public service corporations, but in its attitude almost invariably puts them all in the same class.

In the past I do not feel that the public service corporations have been well enough acquainted with each other, and I think it is high time we all recognize a common danger, a common purpose and a common interest. Much has been done, and such work should be continued and fostered and entered upon with a spirit of give and take, trying to get at the different points of view, the different problems incident to the various lines of business involved.

There is a certain technique peculiar to the gas business and to the telephone business, but the difference lies only in a few points of technique. The general underlying principles of the business are the same. Publicity, dealing with this common interest in underlying facts and principles, is needed.

The growth, the development and the necessity of national advertising depend primarily upon the number of things which are of national importance. In a primitive state of society it made little difference to an individual or a community what was happening to some other individual or in another community; but with the advance of civilization came co-operation between individuals and communities, and co-operation developed the necessity for a more extended knowledge. Civilization to-day might well be estimated and measured by the degree to which universal co-operation has been developed; and, inversely, the number of things which are of universal importance depends entirely upon the degree to which civilization has been developed.

There is co-operation between the producer of manufactured products in Philadelphia and the consumer of those products in Kansas, and there is likewise a similar co-operation between the producer of farm products in Kansas and the consumer in Philadelphia. There is co-operation wherever there is more produced of a commodity by an individual, by a corporation or by a community than can be consumed by the producer. This overproduction makes distribution necessary, our wonderful systems of transportation and of merchandising make it possible, but in order to follow distribution with consumption there must be a widespread knowledge of the product; and advertising is the only method for enlightening the consumer as to the nature and value of the product.

Advertising a System of Education

From the above it logically follows that advertising is a system of education, and it is a very important branch of education. Its importance is measured by our needs. Until within a comparatively short time the real necessities of the people on this earth were limited to a very few things. In so recent a period as medieval times there were comparatively few commodities which people actually needed. The complexity of our modern life makes education through advertising an absolute necessity. We need a tremendous amount of information concerning things which we must have because of the requirements of our present civilization. Our lives touch so many and so varied interests at so many points of contact that without this form of education we cannot have the knowledge necessary for existence on the plane on which we now live. Every day we must have greater knowledge in order to keep up with the times. We may all start in on the system of education brought to us by advertising; none of us may ever hope to finish the course. It is easy to matriculate, but impossible to graduate.

Large Sums of Money Required

That national advertising requires large sums of money goes without saying. The publications employed must have wide circulation, reaching a vast number of people, and the charges to support such circulation may seem high, but when the cost per copy is considered the advertising is really reasonable and economical.

But there are other elements which must be observed in order to accomplish results in national advertising.

(*Continued on page* 389.)

Sees Nothing Intricate to the Labor Problem — Freak Remedies Will Not Solve It, but Putting into Practice Certain Fundamental Principles We Are All Acquainted with Will

George B. Cortelyou Recognizes Right of Employee to Be Adequately Compensated and in All Respects Recognized and Treated as Essential Part of Country's Industrial Life — But He Also Sees Certain Essential Rights of the Employer

Some companies are experiencing a high percentage of turnover, which makes for lowered morale and uneconomical administration with their clerical staffs, declared George B. Cortelyou in his presidential address before the annual convention of the American Gas Association. The embarrassments of these employees are peculiarly their own. Wherever we have not done so we must make such adjuustments of employment conditions as will in substantial measure meet this situation, for we fall short of our highest administrative organization if we do not inspire a spirit of incentive and encouragement among all our employees.

From the clerical workers we turn to another essential group, the labor, as it is termed, the labor upon which we must rely for the efficient conduct of our plants and shops and other similar departments, in which the turnover is also large.

Labor Not an Intricate Problem

This problem of labor is, as I am sure we all understand, one of the most serious that is before us today. It will not be solved, on the one hand, by any involved method, or, on the other, by any sleight-of-hand process. Its solution will lie along lines that unite a knowledge of human nature with a realization of the rights of the worker to be adequately compensated, and to be in all respects recognized and treated as an honorable and essential part of the country's industrial life. Charity, under whatever guise, is and should be abhorrent to him. It is destructive of his self-respect, corrupting in its influence upon his character. The worker who is given the opportunity to develop his own life will be a better citizen than one who is coddled by sumptuary legislation. Opportunity, under law, must be made a reality to him, that honest work and loyal concern for the interests of his employer may in good faith be exacted of him.

Loyalty to the Government, recognition of the rights of the public, straightforward observance of obligations are due from employer and employee alike.

It will be through an adherence to the fundamental principles of American democracy that we shall reach a solution, and, whatever else it may embrace, class legislation and class distinction will have no part in it.

And these remarks apply to all departments, to all officials and employees. The spirit of efficient service must be encouraged and everyone employed in the industry must be made to feel that he is engaged in an honorable calling and that the future holds possibilities of permanency and advancement. Co-operation in the fullest measure, of course, but in every office and plant and workshop there must be inducement to individual effort and individual initiative. That is the American way. That should be the way of the gas industry; and if the American Gas Association can contribute substantially, in effort and enthusiasm, in research and results, to so shaping the industry's progress it will deserve well of those in whose service it is engaged.

The Gas Man in the Community Life

Aside from these more domestic concerns of ours, let me refer, for a moment, to some connected with the use of our service.

Every officer and employee should make himself an influence for friendly relations with the public through efficiency and courtesy in the treatment accorded each customer. Half-way methods will not avail; the influence must be continuous and wholehearted. Let the head of every office see to it that there shall be no complaint of lax handling of any customer's business, and that there shall be extended to him at all times the fullest courtesy. Make every piece of work done, every appliance installed, every transaction of whatever nature, a nucleus of good feeling. Make the service in the finest sense a popular service.

In the general conduct of our business let us not fritter away our time in profitless discussion of non-essentials. With attractive new fields before us in the fuller application of our product to the fuel requirements of the people and in certain other directions that at once occur to the alert gas man, let us throw our resources into the effort to meet these demands. As to standards and rates and all their related subjects, let us fight openly and strenuously for what we believe to be best alike for the public interest and for our own. The industry cannot, ostrich-like, poke its head in the ground and expect to protect itself by doing so. The people are watching it as never before. Let us hold up our heads and give them the facts upon which an intelligent appreciation of our service can be based.

America Will Lead

Finally, let me say this: Every gas company in the United States and every other company coming within the requirements of the association's constitution and by-laws should be a member of the American

Gas Association, and should encourage officers and employees to become members. The association is to make an honored and influential position for itself by the timeliness of its contributions to the welfare of the industry and by the exact and impartial character of the data it distributes. We believe it worthy of encouragement and look to you to hold up the hands of those who are giving it their time and material support.

The business life of the world is in a state of extraordinary readjustment. In this critical period America will lead, as she has led in the past, along the pathway of sound principle and enlightened progress. We have made great contributions to human betterment, and while we falter at times we seek to realize, as far as human frailty will permit, ideals of truth, justice and right-living. But to-day, as in all times of unrest, we are beset by a multitude of the hasty, the unthinking or the evil-minded with panaceas for the relief of conditions about which even the wisest among men and women hesitate to reach definite conclusions. The great mistake most of our present-day theorists are making is that while they are correct in the opinion that we are living in a world distraught, their remedies overlook the fact that the only effective cure will come through the age-tested formula of hard work, frugal living, economical government and thorough co-operation.

As a people we can meet our responsibilities only through the devotion of our citizens, and business throughout the land should instill in its employees this spirit of fidelity.

Our public utilities should be schools of patriotism. Lessons of loyalty can be learned by precept and example in office and workshop. We can do much to make clear to a multitude of workers their rights and their duties under our American institutions; the high privilege that is theirs in this land founded upon the principles of ordered liberty, of opportunity, of democracy.

And we hear much of democracy in these days of turmoil and transition. It is frequently defined in strange terms that grate harshly upon the ears of those who try to read aright the teachings of the immortal Constitution. But do we not voice the very spirit of this America of ours if we say, as did a great preacher of old:

"It is a serious responsibility that goes with liberty; if you have it you must use it in the fear of God for the good of others as well as for your own good.

"Democracy does not mean a universal level. It does not mean equality. It means equitable opportunity."

At the dinner of the association Mr. Cortelyou said in part:

I acknowledge gratefully your kind introduction. To be associated with the men and women of this organization is a privilege that I prize most highly, and I am under deep obligation to them for their support and encouragement.

When I think of the former I think, too, Mr. Toastmaster, of that splendid people to the north of us and of many anxious moments during the great war when the allied world was thrilled by the heroic devotion and knightly gallantry of the Canadians. As Premier Borden of your country said a few days ago:

"By ties of ancestry, of a common language and literature, of like ideals and institutions, and of constant and increasing social and commercial intercourse, the two countries are forever indissolubly united in the bonds of understanding, friendship and peace. To these has been added in the years through which we have just passed, comradeship in arms for the greatest cause that ever demanded humanity's highest sacrifice.

"Our beloved country, harassed at times by doubts and fears, warming at her hearthside enemies who have found their way into her household through the prodigal hospitality of her institutions, but always coming through her periods of danger as clear-eyed and unafraid she moves unceasingly on to her proud destiny among the free peoples of the earth."

The author of a recent book has called America "The and of Fair Play." Those who drafted the announcement of the program for this convention adopted as its watchword "Let's go." There appears to me to be a certain relation between the two expressions.

The land of fair play! The author's designation is a peculiarly happy one. Whatever defects of government or of society there may be in this great nation, it is the country of our hope and of our love, whose people still have faith in the eternal principles of honor and justice. Opportunity still beckons us to the heights of achievement, success still waits upon ability and loyalty, and the average man asks only for a fair field and no favor. America is still a land of ideals. Its eager, pulsating, conquering industrial life is more frequently than we realize made radiant with lofty purposes and patriotic endeavor. In this mighty business activity we have a part to play, a great public service to render. This association is organized to help us to render that service.

Achieving an Ideal

"Let's go!" implies not alone an invitation but an ideal. Its significance in present-day speech is based largely upon the impression it conveys of co-operative effort to obtain a common object. Indeed, the more one reflects upon it the more aptly does it apply to the conditions that to-day exist in our association. The association is organized. The industry has been canvassed. The members are massed together in an enthusiastic forward movement for new fields of usefulness, for greater efficiency in the old fields, for full and ungrudging recognition by the public. We call for volunteers to fight for an ideal. Surely it is more than an emotional aspiration. It is, in fact, practicable and possible of realization. In these respects I am sure it appeals to us in an especial way, so wearied are we of the fancies of visionaries in these disturbed times. We can achieve that ideal, and my interpretation of the spirit of this convention is that it intends we shall achieve it.

You will recall that the obtrusive Mr. Winsor, who figures so vociferously in the early history of the gas industry, in order, as he expressed it, "to erase all doubts and eradicate every prejudice," drew up a few plain questions and answers. One question and its answer were as follows:

(*Continued on page 376.*)

How a Company that Serves Several Cities, Towns and Villages Handles High Pressure Distribution

George T. Macbeth Describes System of Westchester Lighting Company and the Method It Employs

The Westchester Lighting Company supplies a district including several cities, towns and villages. The district roughly is six miles wide at one end, fifteen miles wide at the other and fifteen miles long, and has a population of about 390,000. It contains over 500 miles of distribution main and 75 miles of pumping main, according to George T. Macbeth in a paper at the American Gas Association convention. Gas is sent out from five stations at an initial pressure not exceeding five pounds per square inch. In the immediate vicinity of each station the gas is distributed under holder pressure. Outlying holder stations are interconnected by high pressure mains. The pumping lines are laid so as to pass through the larger villages where low pressure systems have been installed. Along the route of the pumping mains, consumers are served from the mains direct through service governors. Small villages remote from holder stations, where the concentration warrants, are supplied with low pressure from one or more "district" governors.

The operation of this system has proven very flexible. The outlying holders are filled in off-peak hours and the low pressure distribution systems are boosted as required during peak hours.

Pumping Plant.

Up to five pounds pressure, the equipment used is a rotary or positive exhauster, directly connected to a heavy type steam engine. Beyond that pressure, it is desirable to install reciprocating compressors. When operating up to 5 lb., the horizontal type of exhauster is preferable as the bearings on the shafts of the impellers have better support. The pumping units have a capacity equal to the maximum consumption.

The engines are provided with the usual automatic governor and are also equipped with a modified "Huntoon governor." The "Huntoon governor" controls the speed of the engine so as to maintain a constant pressure at the outlet. The float or chamber of this governor is sealed with mercury and is placed as near as practicable to the valve in the steam line. A small receiver is placed in the pressure line to the governor to prevent the transmission to the governor of the fluctuations caused by the impellers of the compressor.

An automatic valve and gas by-pass are installed around the compressor to insure at least holder pressure on the outlet of the compressor in case the engine should stop or break down. By the use of the governor for regulating the speed and by the automatic by-pass valve, the labor required for operating the compressor is reduced to a minimum. The outlet pressure can be fixed or varied as desired. We find it possible, by exercising due care, to supply the holders along the lines without materially affecting the pressure on the line.

Governor Pits.

We divide these into two general classes: Principal or main supply governor pits; pressure reinforcing governor pits.

The dimensions which we have adopted for main supply governor pits are as follows:

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Principal or Main Supply Governor Pits;
Pressure Reinforcing Governor Pits.

The dimensions which we have adopted for main supply governor pits are as follows:

For 6 in. double governors, pits—9 ft. by 6 ft. 8 in. by 7 ft. deep.

For 8 in. double governors, pits—9 ft. by 6 ft. 8 in. by 7 ft. deep.

For 3 in. to 8 in. single governors, pits—4 ft. 9 in. by 5 ft. 6 in. by 6 ft. deep.

For 10 and 12 in. single governors, pits—5 ft. 9 in. by 5 ft. 6 in. by 6 ft. deep.

Galloways Transmission Oil is mixed with concrete in constructing the walls of these pits, for the purpose of waterproofing them. Where it is not possible to drain the pits direct to the sewer, a 6 in. pipe is carried through the wall to a standard drip pot set outside of the governor pit. This drip is equipped with standard pumping pipes which are brought to the surface and covered with a box. The drip pots are pumped with drips on the gas main system.

Each pit is provided with two 6 in. ventilating connections. The inlet or fresh air pipe comes from a "fresh air box" about 16 by 16 in., set in the sidewalk at the curb. This enters the pit at the bottom on the corner opposite to the outlet pipe. The outlet pipe is taken from the top of the pit and is carried to the curb and then vertically into the air about 12 or 14 ft. The top of the riser is equipped with a ventilator hood. If

a telephone or electric light pole is near the governor pit, the outlet vent is carried to it for support.

Manholes in these pits are of sufficient size to permit the governors to be passed through them and are located on the side of the pit farthest from the traffic.

Pressure reinforcing governor pits are built of brick. They are circular and have a 3 ft. inside diameter. They are equipped on the top with ordinary cast iron sewer manhole covers. The pits are not waterproof as we have found that the governors will operate satisfactorily under water if the governor covers are tight and the vents are carried above possible flooding level. The vent consists of a 1 in. pipe carried through the side of the pit to the nearest telephone or electric light pole. The head of the vent is equipped with a return bend to keep out rain water. The governors in these pits are usually not over 4 in. in size. It is the usual practice to equip the governors with the "Earnshaw" bottom connections and thereby gain about 50 per cent in governor capacity.

Where governors are set at low points in the main, drip pots are installed on the inlet and outlet. Ordinarily the usual drip on the bottom of the governor will take care of the condensation which collects. The inlet, outlet and by-pass valves on governors are located in the street outside of the pits and are controlled from the surface. An additional gas valve is placed on the outlet of the governor inside the pit which is used in connection with Kellogg-Crowell automatic pressure control apparatus referred to later.

When supplying isolated districts which have no other source of supply, the governors are set in duplicate. Where districts have more than one supply, a single governor is set.

The Reynolds Regulator Company have developed a special diaphragm for the dash pots on their governors, to replace the old mercury seal. We find that this apparatus works very satisfactorily even when the pits are filled with water and they are cheaper than the mercury seals. Recording gauges with weekly charts are connected at the inlet and outlet of each governor. The gauges are placed in boxes mounted on poles or on the outlet ventilating pipe, above the ground. We find that recording gauges set in damp-proof boxes placed inside the governor pits do not give satisfaction.

Instructions to Be Observed by Those Engaged in the Inspection and Maintenance of District Governors.

No. 1. No one shall enter any manhole for any purpose unless a second man is on the street level and at opening into manhole ready to render instant assistance should it be needed by the man who has entered the manhole.

No. 2. No open flame light shall be used in the manholes or near the openings into same and no one shall smoke in or near them. A portable safety electric light must be used when a light is necessary.

No. 3. In case it should become necessary to enter a manhole into which gas is escaping, the man so entering shall have the leather life belt securely fastened about his body and the line fastened thereto, the other end leading up through opening to street and in the hands of the man at the street level.

A respirator is kept at the superintendent's office for use in manholes in cases of emergency.

No. 4. The following articles are to be kept in the manholes and in good order at all times:

Two Red "Danger" Signs.
Two Red Lanterns, unlighted.
One Valve Key.
One Thermometer.
One Life Belt and Line (in Canvas Bag).
One Wooden Ladder.
Two Galvanized Iron Cans for Waste, etc.
One Broom, one Dust Pan.
Ink, Key and Charts for Gauges.

No. 5. The following procedure shall be observed in entering manholes:

A.—Open cover.

B.—Take out "danger" signs and if at night, the red lanterns (without entering manhole) and set same in position to guard opening. The lanterns should be placed at least 15 ft. from manhole.

C.—Take out wooden ladder (without entering manhole) observing at the time whether there is any odor of gas.

D.—If no odor of gas exists, mount ladder and enter manhole.

E.—If odor of gas exists, and it is necessary to enter manhole, use life belt and line and send for respirator if necessary.

F.—When leaving manhole be sure cover is closed securely and all company's property returned to same.

No. 6. Should trouble of any kind be observed at any station, works or office or by manhole inspector, superintendent's office is to be notified by telephone at once.

No. 7. No one is to handle or change condition of any valve on transfer system of piping without special instructions from engineer's office.

Inspection of such valves will be made from above office, and valves will be known by numbers marked on them.

No. 8. Inspection shall be made of each manhole in operation, as ordered from engineer's office, which shall be at least once every week and after every heavy rain. The various parts of governors and auxiliary apparatus shall be designated as follows:

Part No. 1. High-pressure auxiliary governor valve.
Part No. 2. High-pressure auxiliary governor.
Part No. 3. Needle valve.
Part No. 4. Low-pressure auxiliary governor.
Part No. 5. Low-pressure auxiliary governor valve.
Part No. 6. Transfer pressure gate valve.
Part No. 7. Distribution pressure gate valve.
Part No. 8. Auxiliary bowl.
Part No. 9. Auxiliary bowl counter weights.
Part No. 10. Main governor.
Part No. 11. Connecting rod coupling.
Part No. 12. Lower connecting rod.
Part No. 13. Upper connecting rod.
Part No. 14. Transfer pressure gauge.
Part No. 15. Distribution pressure gauges.
Part No. 16. Vent pipes.
Part No. 17. Manhole cover.
Part No. 18. Drains.
Part No. 19. Iron ladder rungs.

No. 9. All parts of governor installation must be kept oiled at all times to prevent corrosion.

No. 10. Diaphragms shall be oiled at least once a year with the following compound: 1 quart neatsfoot oil; 1 quart sperm oil.

No. 11. All recording gauges shall be checked

against "U" gauges at each inspection and kept in good working order. "U" gauges to be left closed at all times except when inspector is using them to check recording gauges. During months October to March inclusive, "U" gauges shall be filled with grain alcohol and the recording gauges checked to the corresponding water column pressure.

No. 12. All valves, cocks, etc., shall be kept in free working order.

No. 13. Manholes shall be kept clean and neat and well painted.

No. 14. Vent pipes must be examined and kept free from obstruction.

No. 15. The distribution pressure to be maintained at governor outlets will be ordered from engineer's office and no changes are to be made in same without instructions from this source.

No. 16. When making repairs of any kind to governors, in the performance of which it becomes necessary to change a diaphragm, remove a handhole plate or in any way dismantle the governor or its auxiliaries, the vent pipes, between valves inside and outside of manhole on both transfer and distribution pressure sides, shall be opened to allow any gas leaking by the first valve to escape into the air.

The automatic Kellogg-Crowell pressure control is used for automatically increasing pressure on the outlet side of the governor during periods of maximum send out.

The amount of reduction of pressure can be controlled by increasing or decreasing the flow of gas through the Venturi tube; this is accomplished by closing and opening the extra valve or outlet of governor. We have found that in some cases, the governor outlet valve needs adjustment from four to six times a year, depending on the variation of the load with the different seasons. This apparatus has automatically increased our outlet pressure from 3½ in. to more than 9 in. during hours of maximum demand.

"Reynolds Modified" service regulators are installed where individual consumers are served direct from pumping mains. The modification consists in substituting a valve larger than that usually supplied with the high pressure regulators.

Holders on pumping lines are equipped with inlet valves. With this arrangement, the holders can be filled without lowering the pressure in the main to any extent. We attribute this action to the fact that the holder inlet valves open gradually as the holder starts to go down and thus allow sufficient time for the pumping apparatus equipped with the Huntoon governor to speed up and maintain the pressure.

We have found that 7 in. is the minimum pressure permissible at the governor inlet and it is desirable, at all times, to maintain a pressure not lower than 10 in. at the end of the pumping system. Governor pits are visited regularly twice each week for inspection and for maintaining pressure recording gauges.

We have made it a practice during the construction of the governor pit to leave a wire in the outlet vent pipe which may be used for pulling in a service for an electric heater to be used during cold weather. While governor pits are heated in some places, the conditions prevailing in our territory have not yet made this necessary even though at times the thermometer registers considerably below zero.

The inlet and outlet connections to the governor are made of wrought iron pipe where they pass through the wall of the pit. The ends of these wrought iron nipples are upset to form a bead for caulking into the cast iron hub.

Each main supply governor pit is equipped with a set of tools which are kept in a locked box in the pit. The tools permit the inspector to make ordinary repairs and adjustments on his inspection rounds.

In some cases, the inlet, outlet and by-pass valves are located in the governor pit and it is our practice to remove the valve wheels, and hang them on the walls where they are chained and padlocked.

The first governor was installed twelve years ago. We now have fourteen main supply governors and as many more reinforcing governors operating throughout the system. The high pressure system is supplied by three pumping plants and as previously stated, furnishes gas over the 75 miles of pumping main.

REFERENCES.

The references on record in connection with this system are:

S. C. Singer's paper, Iowa Gas Association.

J. D. von Maur—Proceedings American Gas Institute.

E. H. Earnshaw and G. T. Macbeth's papers in proceedings of Society of Gas Lighting of New York City.

Mr. MacD. Dexter—American Gas Engineering Journal, May 31, 1919.

and other articles which have, from time to time, appeared in various technical papers on the subject of governors, governor pits, exhausters and other apparatus which are used in connection with these systems.

Gas for Motor Boats

Some interesting facts regarding the use of gas as fuel for small internal-combustion engines is contained in the report which has just been issued by the British Interdepartmental Committee on Use of Gas as a Source of Power. It deals in particular with gas under pressure, and that obtained from portable producer-gas plant, and, while the report deals with the employment of gas power for motor vehicles, its findings are in many cases equally applicable to motor boats. The report states that the use of gas merits adoption as a commercial alternative to electricity, petrol or steam, and suggests that the gas should be stored in rigid containers wherever compression plant can be installed. The use of metal cylinders made of carbon with certain alloy steels is advocated, the working pressure in the cylinder being up to 2,250 lb. per square inch.

Reference is made in the report to gas produced by the vessels themselves. Such plants, it states, can be made to work automatically after the necessary attention at lighting up, and their fuel-cost with coke at about $11 per ton, or anthracite at $14 per ton, is equivalent to petrol at 12 cents per gallon. One hundred weight of coke or anthracite will, on an average, do the same work as 5.6 gallons of petrol, and the weight of the generator and accessories for a 30 b. hp. engine is about 220 lb. In an ordinary motor engine unaltered as regards compression, the power yield on the basis of 100 for petrol may be taken on the average as 91 for town gas of 450 B.t.u.'s per cu. ft.; 87 for suction-producer gas, partly hydrogenated with water gas, of 210 B.t.u.'s per cu. ft., and 82 for suction producer gas of 140 B.t.u.'s per cu. ft.

If the Cost System Does Not Produce More Income than Its Cost It Is Incomplete and Improper

Frank E. Seeley Takes Stand that Only Five Per Cent of Manufacturers Know What Their Goods Cost Them

Competition to-day makes it compulsory that we have accurate, immediate and full information of the condition of our business. This can only be obtained by proper "costing," asserted Frank E. Seeley, in an American Gas Association convention paper. The modern business organization has become so complex that it has passed beyond the limits of individual observation, unless the individual has some artificial means of transcending these limits. The administrative officer must base his decision on the information compiled by his organization, and he must know that such information is reliable.

Manufacturers must either meet the new conditions with their increased costs of materials and labor and keener, more intelligent competition, or retire from the field. They must eliminate waste and error and increase production with the same labor turnover by better machines or better methods. To do this the entire activities of the plant must be brought before and under the control of the management.

The Sherman act prohibits manufacturers from adopting uniform selling prices; it does not prohibit manufacturers from employing uniform methods of costing, and most industries have seen the necessity of co-operation along this line in order to produce stability. Government statistics show that only 5 per cent of the manufacturers know what their goods cost them.

One argument used against a proper cost system is the expense of installation and of operation. A cost system should not be regarded as an expense; it is an investment; it is installed for the distinct purpose of increasing profits. If the cost system does not produce more income than its cost in clerk hire and overhead, then the system is incomplete and improper.

No doubt many who read this paper have tried out some of the theories of costing and have been discouraged to an extent that has driven them to believe that the chief end of all cost accounting is to provide for any business a never-ending supply of red tape of high quality, guaranteed to slow up production in even well-organized manufacturing establishments.

Need of Readjustment

Where this has happened, however, one of two things is true—either there is actual active opposition to a new process that is a vital necessity in these times (usually due to a mossback attitude on the part of the "practical" man who prides himself on his self-sufficiency), or else the most essential part of the installation of cost systems has been omitted, namely, the complete final adjustment of the system to the business; for it is true that no new system can ever be planned that does not need to be readjusted to perfect its entire fitness after trying out during a reasonable working period. This readjustment is the polishing off, the refinement, that takes time and patience and forbearance and co-operation and faith and common sense and persistence and a few other superhuman qualities.

But it can be accomplished. And once done, it is a joy forever. For, it gives the business man a feeling of certainty and confidence that nothing else can give, provided, that he takes care to see that his cost accounting machine is adjusted to turn out its product with the right jigs, fixtures, gauges and other essential tools.

Care must be taken, however, to complete the cycle that is to bring both ends together and insure that the results and records compiled in your costing are available in proper form for managerial use.

In addition to a monthly balance sheet and operating statement your system should show the following:

The total sales as against previous periods.

Salesman sales against the expense showing profit or loss for each salesman or territory.

The selling price of each article against the cost of the article. The articles or lines which show loss can thus be adjusted or eliminated.

The manufacturing losses due to waste, defective work, poor supervision or leaks.

The amount of day work and piece work, the productive labor and non-productive labor.

To go at length into the various ramifications of a proper cost system would require volumes. I will cite, however, a few fundamental features.

Fundamental Features

Total cost is properly subdivided into three main components; manufacturing, selling and administrative. There should be no difficulty or confusion in separating these costs if you consider the "selling" as though done by a distinct organization, complete in itself, renting the place it occupies and bearing its full overhead, and "administrative" as the executive office, supervising manufacturing and selling, collecting, distributing and accounting for the funds of the corporation, renting the space it occupies and bearing its full overhead.

Coming then to manufacturing cost, which is the principal cause of confusion, we find it subdivided into three elements—material, labor and overhead. Any error made in charging material and labor into costs can, I believe, be passed over without comment. The real source of error is the third element of costs, known as "overhead." This is the least understood, most discussed and most abused of all the elements, and is without doubt largely responsible for the deplorable condition now existing. In spite of intensive and intelligent study in our various plants, we know that concerns manufacturing similar products for the same market differ as much as 50 per cent in their apparent costs. I say "apparent costs" because I feel that the actual costs, due to material and labor charges, differences in methods and construction, advantages and disadvantages

in location of plants, would not affect our costs over 20 per cent. Other industries have found that 15 per cent even was a fair measure of this difference.

Any industry will be chaos as long as this lack of uniformity is allowed to exist, and yet important as it is, nothing but the most half-hearted methods are being employed to correct it. The remedy is simple, and considering the value of the attainment, the cost is negligible. It is not necessary for each manufacturer to throw out his present cost system and install a new one, providing his present system is proper and gives him a correct picture of his operations. He must, however, know that this condition exists. Many systems, as they now exist, are substantially correct. It is only necessary that the system function properly, and that it include all actual existing elements of cost, and no imaginary or fictitious charges, and that it provide that the overhead be neither over-absorbed nor under-absorbed in the actual final figures. Uniform practice should be established if our industry is to endure and succeed, and I will indicate briefly some of the important requirements.

There are certain items which go into overhead which can be dismissed in this paper, for while important, they are readily classified and recognized. Among these are non-productive labor, rent, heat, light and power, supplies, insurance, local taxes, inward freight, express and cartage, telephone and telegraph, defective material, repairs and replacements, etc.

There are certain other items which it seems desirable to touch upon as they are so important that it is necessary, if the industry is to be stabilized, that they be handled in a uniform manner by all manufacturers. There are taxes, interest, depreciation, reserves, etc., which I will discuss in the above order.

Taxes.

Income, excess profit and capital stock taxes should not be included in overhead. They are deductible from profits on your financial statement.

Interest on Investment.

This item is the most widely discussed of any item of cost accounting. As far as I can discover, 60 per cent of the accountants who have expressed themselves on this subject favor, and 40 per cent are opposed to including it under costs. It appears that 90 per cent of the accountants who have specialized on costs advocate its inclusion as a cost, and I believe manufacturers generally feel that such charge is entirely proper.

If you charge into cost the interest on money borrowed from the bank, it seems reasonable to charge into cost the interest on invested capital. If one branch of your business was largely an assembling operation, requiring a great amount of hand labor but a small investment, and another branch of your business was largely the product of expensive machinery, you would not obtain a true comparison of cost unless interest on investment were recognized as a part of the manufacturing cost.

From the above you will see that I personally favor including, as a cost, interest at least on investment in fixed assets (real estate, machinery and equipment). Whether we do or do not, is not important. The important consideration is that we adopt uniformity of policy in this respect.

For the benefit of those who wish to pursue this matter further, I make the following references:

"Factory Accounts," Garcke & Fells, page 140.
"Commercial Organization of Factories," H. Spencer, page 150.
"Cost Keeping and Management Engineering," Gillette & Dana, page 141.
"Factory Organization and Administration," H. Diemer, page 212.
"Cost Accounts," L. W. Hawkins, page 109.
"Cost Keeping and Scientific Management," H. A. Evans, page 37.
"Depreciation and Wasting Assets," P. D. Leahe, page 53.
"Bookkeeping and Cost Accounting," William Kent, page 128.
"Cost Accounting," J. Lee Nicholson and John F. D. Rohrback, page 138.

In any case this must be considered in making our selling prices and it is only a question of where we put it. The last mentioned authorities suggest a compromise method which is worthy of consideration.

Depreciation.

We are all agreed that depreciation is proper, the source of discord, if any, being entirely in the amount. In determining this, the life of the asset must be approximated, but it should never be written off beyond its scrap value. Under this subject, of course, must be considered "obsolescence" and "amortization."

In order to leave some definite recommendation in this respect, I suggest the following as a fair average depreciation for the principle items with which we have to deal:

	Per Cent
Buildings, concrete	2
Mill Construction	3
Frame	5
Machinery and equipment (Including piping)	8
Handling and conveying appliances	10
Furniture and fixtures	12
Patterns, metal	25
Wood	100
Flasks, metal	33 1/3
Wood	50

Reserves.

Reserves are necessary for an anticipated indeterminate expense. Care should be exercised to see that they represent a fair estimate and are not overloaded.

There is one other item which I have never seen in any cost formula or treatise, which is, to my mind, of fundamental importance and which I feel enters more strongly than any other into the differences now existing in our various cost figures. This is the volume of business used as a basis for our costs. As this volume fluctuates from month to month, our labor and consequently our overhead fluctuates with it. If a certain range is made up of $5 worth of material, $5 labor and $5 overhead this month on a certain volume of production, and your production is cut in half six months from now, it is unfair to say that your overhead is increased almost proportionally, and the range now must bear $9 overhead instead of $5. I claim that there is a normal volume for each plant, which may change gradually for a period of years, but which

should be used as a basis for applying overhead. There can be established an account which I shall term "unused facilities," which can be credited with over-absorbed overhead in busy seasons and debited with under-absorbed overhead in dull seasons. In this manner violent fluctuations in actual costs, estimated costs and resulting selling prices can be stabilized and the market strengthened and made less of a speculative nature. If this were done, price changes would be gradual and consistent, increasing or decreasing with market conditions. This, I believe, cannot be too strongly brought out or emphasized.

Be sure that your overhead is applied departmentally, as in this way undue expense in any department is more easily recognized and brought out, and lines requiring undue expense can be weeded out in preference to lines which are more remunerative because of less hand labor, less loss and less attention, in proportion, to selling price.

Even though a manufacturer may feel that his costs are proper, adequate and accurate, and he has always before him a composite picture of his business, it is equally important for him to insure his competitors' costs being equally so, but instead of joining in a movement at slight expense to insure safe and sound business methods, most manufacturers will sit back in smug efficiency simply because they feel that their method is correct, not realizing that a competitor selling at ridiculously low or ridiculously high prices, because of improper costing, is hurting other manufacturers and hurting the industry, and that what hurts the industry also hurts the commodity, and that his own price, even though proper, may be misjudged by comparison with improper and unfair competitive prices, to say nothing of the business which he may lose because of the other fellow's ignorance or negligence.

If the previously outlined methods are followed out and handled uniformly in all plants, variations in costs will represent actual values modified only by improved methods or organizations, and it would not require much investigation for a manufacturer to find and correct his weakness to the general betterment of the industry. Now, however, when two manufacturers start to compare costs, so much time is consumed in eliminating items carried by one and not by the other, or in modifying certain other items and redistributing overhead, that by the time they reach common ground, both are so worn out that they call it off and go to a ball game.

Selling Prices

I feel impelled to touch briefly on that corollary of costs, namely, selling prices. No selling price is honest if it does not properly reflect the cost of the article. No intelligent buyer favors a condition such as exists to-day in our industry with its lack of uniformity and stability. A buyer is willing to pay a fair price for what he gets, and he would rather purchase at a price based on actual cost and value, than, on the one hand, force a concern out of business because it does not know or does not recognize its costs, or on the other hand pay profiteering prices because of improper costing. A buyer wants honest value at honest prices. Selling at below cost, is, to my mind, unfair competition, and should be considered as such and penalized accordingly. Selling at abnormally high prices is equally reprehensible.

There are many concerns that have been spending large sums of money on installing and maintaining elaborate cost systems only to repudiate their own judgment and managerial alertness by utterly disregarding their costs and fixing their selling prices with respect to those of their competitors. The idea that your price should be lower than your competitor's without regard to your cost is not only unfair to yourself, unfair to your product and unfair to your competitor, but it is poor merchandising and, if not based on cost, it is a dishonest practice. Business dealings should be based on justice—justice for the seller and justice for the buyer. It is not just to the buyer if your selling prices are not properly based on your costs. It is not fair to the consumer who ultimately pays for your poor judgment if not for your dishonesty. It is not fair to your stockholders or to your workmen if your selling price is not based on costs, as such practice affects both the returns to your stockholders and the returns to your labor. Merchandising should be done on the sound business principles of proper costing. Justice should be the cornerstone of your dealings.

In closing I would like to leave this message. Know your costs. Adopt a fair and just selling price based on your true costs and not on your competitor's selling price. Have the courage to do what is right, and you will win the confidence of the buyer, the good-will of your competitor and the respect of the community. You will have left to the industry of which you are a part, the lasting memory of a wise and constructive leader, and a courageous and honest competitor.

Gas Stoves in France

According to a recent issue of the *Ironmonger*, all countries dependent on imported coal will find themselves confronted with a shortage of fuel, and they must find a substitute. In cities like Paris where it is certain there will be no shortage of the gas supply, gas stoves offer the best solution of the heating difficulty. On account of the sparing way in which gas is served out, the demand for stoves is not so great as in normal times; if it were so, manufacturers would be quite unable to supply requirements owing to the difficulty in getting castings, the factories producing these being more or less destroyed during the war. Manufacturers are, therefore, importing large quantities of stoves, made to their own designs and bearing their own names. It is, also, probable that imported stoves cost less than those made in France, where producing costs are very high just now.

Straightening Sledges and Pick Handles

Occasionally one finds a tool handle bent. In this condition it is useless. As it is a simple matter, according to a "Wrinkle" submitted to the recent annual convention of the Pacific Coast Gas Association, to straighten it there is no need to cast it aside.

Warm the handle by holding it over a fire for a few moments. Then rub engine oil into same and continue to warm it until quite hot. Now place the bent portion in a vise, and with a little effort it can be pulled straight. Hold it in this position until cool, remove it from the vise and it will retain its now straight shape.

Unsold Market for Gas So Much Greater than the Sold that No One Need Worry as to Its Limits

C. E. Bartlett Deplores Fact that Gas Business Permits Its Sales Department to Operate Under Handicaps Such as in No Other Business, Large or Small, Would be Considered Tolerable

There are to-day nearly 50,000,000 people in gas served territory. There are 8,500,000 consumers using 327,000,000,000 ft. of gas per year. But great as these figures appear, they are small when compared with the possibilities, declared C. E. Bartlett, in a paper presented at the American Gas Association convention.

Since all gas used must be used through appliances, it necessarily follows that it will be through the sale of appliances that gas will be sold, and while it is possible to calculate which appliances result in the sale of most gas, through satisfactory service to the consumer, broadly speaking, and allowing for replacements, appliance sales mean gas sales.

"The Unsold Market for Gas" is not calculable. But the unsold market for appliances may at least be glimpsed. The purchasing power of 40,000,000 people is difficult to visualize, but even at a $1 per person, a figure attained in the past by many companies, it would mean an annual sale of $40,000,000 in appliances, which is well over twice the 1919 output of all the appliance manufacturers combined.

Of the 8,500,000 consumers of artificial gas, a reasonable estimate is that 6,500,000 are domestic consumers with whom this paper is concerned.

Almost 4,000,000 on Mains but Not Using Gas.

Allowing five persons to a family this leaves 3,500,000 families not now on gas mains although living in gas served territories.

From 1913 to 1914 the increase in number of meters connected was 468,000. From 1913 to 1919, therefore, should have shown a total increase of 2,808,000, instead of which we find 1,688,000. There now exists a shortage of 1,121,000 new consumers.

The United States is short of houses to the extent of between 1,000,000 and 1,500,000. Taking the conservative figure of 1,000,000 and presuming, still conservatively, that only 50 per cent of this 1,000,000 shortage is in gas served territory, and that 75 per cent of the 50 per cent is in artificial gas territory, it will be be seen that 375,000 new homes are due to arise along artificial gas mains as soon as they can be built. If the ratio of 65 per cent of gas consumers to total population be maintained, a most reasonable assumption, 243,750 new consumers will be ready and waiting for gas equipment.

But promising as the field of new consumers appears, there can be little serious questioning that the big unsold market lies in the present 6,500,000 families, domestic consumers, who are for the most part undersold on equipment, or only part time users of gas, or both. That this field is the most fertile one for immediate development can scarcely be questioned. Here are 6,500,000 homes into which gas has already been introduced, and where is there a home in this country in which not only the convenience, but the absolute indispensability of gas has not been emphasized during the extraordinary

circumstances of the past two winters? These homes do not require any expenditure for services, hence they constitute no drain on the stream of new capital now being so carefully conserved.

And to these homes the considerable number into which services have already been introduced, but which are now gas consumers, and it would be hard to imagine a more attractive field for exploitation.

Included in the attractiveness of this field must be the new classes of buyers added to the active prospect lists by present conditions. Never in the history of our country has the working man been making the money that has been his fortune in the immediate past and which will continue to be his in the future. It is characteristic of him that along with his lavish expenditures on jewelry, oil stocks and clothes, he is spending money on his home. Remember also that since July 1 much more money is available for home uses, not only among the consumers of this class, but among all.

Furthermore, 4,000,000 of our nation's best young men are being returned to their homes. Fully half of these boys are coming back with new ideas on the value of sanitary living and clean surroundings. Their influence on the homes to which they will return will be incalculable.

For the first time in their experience, the owners of the most luxurious homes are now feeling the need of labor saving devices. It is their own labor which they are now anxious to save. The domestic servant problem is becoming more and more a thing of the past, for servants are apparently following the course of the passenger pigeon to extinction.

Changed Competitive Conditions.

The class to which gas appliances and other labor saving household machinery formerly made no appeal, because they made no difference to the actual living conditions of the household, now is actually in the market with an eagerness to buy anything that will save minutes, steps or discomforts, regardless of expense.

Changed competitive conditions must also be considered as an important element in the factors now so favorable for gas sales.

Both coal and oil have advanced to points undreamed of in the past, while the advance of gas in comparison is negligible. Nor is it likely that any recession may be looked for in the cost of competitive fuels. Gas is to-day, for many uses, the cheapest fuel. Uncertainty of supply of competitive fuels is a factor urging many to the use of gas, while the labor element of fuel cost is so high and scarce that it alone, when added to the cost of competitive fuels, is sufficient to swing the decision to gas fired apparatus.

For those who may still persist in pessimism, or who may even believe in a "saturation" point in appliance sales, there are, in addition to the already listed dishes in the feast of expectation, the courses of the as yet undeveloped or unemphasized uses for gas.

Admit for the sake of argument only, that cooking and lighting have been pushed to the point of decreasing returns. Water heating, auxiliary space heating and laundry appliances remain untouched when viewing the country as a whole. The staggering possibilities here are visible to the imagination of anyone, with but a suggestion.

Such briefly is the unsold market for gas. The further development of the theme is unnecessary. To one navigating a bay and seeking further room for maneuvers, a glimpse of the ocean is enough to probe its distant shores but a waste of time. The "unsold" is so far greater than the "sold" that no one need worry as to its limits; nor could they be defined, for inventive genius each year will add available appliances and new fields of usefulness.

The gas company makes, distributes and sells a commodity. Whether that commodity be gas or service or both, it is a commodity and must be profitably disposed of if the company is to pay dividends.

Let it be admitted then that the gas company is at basis commercial, just as commercial as a peanut stand or a department store.

The very cornerstone of any commercial structure is good-will. Whether the converse be true may be debatable, but it may be fairly assumed, nevertheless, that any business dependent upon good-will is commercial. How then may good-will be sought by the gas company if it has not been obtained by present and past practices?

Would it not be a good idea to begin with the first impressions? Any mercantile business worthy of the name makes an especial effort to see that its first contact with the public is made with a favorable impression. An accountant fills a most useful place in the world. Accuracy is his middle name. Correctness of record and statement are such a part of his life and its habits, that he has no patience with one without those habits of thought. He has never in his business life, however, learned the consequences of discourtesy or impatience, nor can he understand that most of us poor mortals do not think with accuracy, nor speak in trade terms or with absolute precision.

The accountant may be courteous, tolerant, affable; sometimes he is, but more frequently he is not, but never is it a necessity for him to possess those qualities to attain success. Now, why should this man, excellent and useful as he is, be selected by the gas company to greet the prospective consumer and take his application? Even Heaven has the Recording Angel to run the books, but St. Peter, the old sinner with human sympathy born of a memory of earthly weaknesses, greets the trembling applicant, and if it is necessary, according to the book for St. Peter, to tell him to go to hell, he will no doubt do it with a smile and a wish that his future apartment be relatively cool. If a gas man seeks a true impression of his standing with the public, let him size up the expressions on the faces of the people waiting to make applications for service. No corporation but a public utility would dream of permitting a new customer to come into contact with anything but the sales department. Is this not logical? Has it not a basis of sound reasoning.

But One Point of Contact.

What institution save the gas company would permit its customers later to be influenced by complaint men, shop men and fitters who never have had and, from their very occupation, never will have any idea of the relationship between conduct or speech that begets good-will and their prosperity, or that of their employer? Can any successful business be named where the men who consummate the work of the sales department are not under the direct control of the sales department?

Why then, if the gas company is commercial, should the public have but one point of contact with it, where there is a reasonable expectation of obtaining, as a matter of course, not of surprise, courtesy, willing attention and, in general, qualities begetting good-will? And why should the gas company cloak the one department that shows any of the spirit of modern business under the meaningless title, "New Business Department"? Why should its salesmen be dubbed solicitors, canvassers, representatives, boosters and other ridiculous titles printed in the southwest corners of their cards for so many years?

Is "sales" a term of disgrace? Are John Wanamaker, Marshall Field, Charles M. Schwab, F. W. Woolworth, Frank A. Vanderlip and a host of others who have symbolized America, less worthy of respect because they are primarily salesmen?

Even the so-called "new business departments" as at present constituted, have proved times without number that they can be run on a profit-sharing basis. If this be true, why are they now conducted, in the majority of instances, so that the net results of their operation appear in "Expense Promotion" instead of "Other Income"? Is it not an absurdity to regard them as a sort of doubtful expense to be discontinued at will and at the same time, to hope to obtain for them ambitious, progressive men? What hope for advancement, greater earnings or permanency of employment can these men hold in this branch of the gas business? To what extent can they expect to employ their talents? Try as they will they may meet their customers at just one point—the selling of the appliance. The application for gas, the passing of credit, the delivery and connection both as to time and performance are matters beyond their control. Some one outside of their department frequently buys the goods they sell, tells them what is to be charged against their efforts, and determines when to strive for sales or to slow up until it is convenient or possible for works or shop to permit them to go ahead again. Then, if in spite of an overloaded overhead and these other handicaps, the new business department makes good, the manager thereof may be, not necessarily will be handed a sop in a small increase of salary. Or if he does not quite make good in the way of profits, or if conditions over which he

(*Continued on page* 386.)

In Order to Determine the Relative Efficiency of a Gas Machine It Is Necessary to be Able to Determine at Any Time the Quantity and Quality of Gas Which the Machine Is Producing

R. A. Carter, Jr., Describes Portable Device that Makes Such Determination Possible—Adaptable to Investigation of Many Problems Incident to Water Gas Manufacture

For many years the gas industry has felt the need for some means of determining the relative performance of water gas sets, some facility for the investigation of water gas operation which would disclose the quantity or the nature of the product of individual machines.

An appreciation of the necessity for some device which would indicate the product of one machine independently of that of the others in operation, has led us, in the past, to more or less extensive experimenting with devices and principles, mechanical and otherwise, without having carried us to a practical solution of the problem.

Most devices experimented with, have depended upon the determination of the momentary rate of flow by means of Pitot tubes, the readings from which of static and dynamic pressure can be made to show, with fair accuracy, the rate of production at given moment, and by the application of several

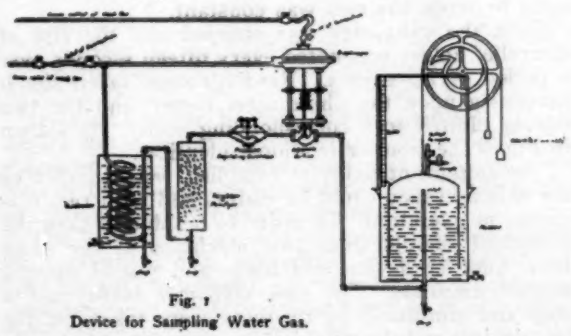

Fig. 1
Device for Sampling Water Gas.

of such readings and calculations we can determine approximately the gas made in a given run.

So also has been the method employed in determining the product. A snap sample is taken on the second or third minute of a run, or a series of samples are taken one each minute or a continuous sample is taken at a uniform rate through the entire run, in each disregarding the rate of production element. Samples so taken are not indicative of the quality of gas which that machine is making.

In order to determine the relative efficiency of the several machines in operation or of one machine under the varying conditions incident to normal operation, it is necessary to be able to determine at any time the quantity of gas and the quality of the gas which machine is producing, declared R. A. Carter, Jr., in a paper at the American Gas Association convention.

Appreciating the desirability of such facility, experiments have been conducted which have led to the development of a device which can be applied to any machine or to all of the machines each in turn, which will not only automatically determine the quantity of gas made during the run, but will also collect a representative sample of that gas, not at a uniform rate, but at a rate dependent upon and proportional to rate of production of that machine, and independent of the performance of other machines in operation. The sample so taken truly represents the product of that machine in quantity and quality.

The device is portable, and being on wheels is readily movable from one machine to another. It can be easily attached and is very simple of operation.

The principle upon which this device operates is the passing of a purified stream of gas at a uniform pressure through an adjustable orifice, the opening of which is controlled by a diaphragm which, in turn, is actuated by the drop in pressure across a fixed resistance.

In this case the fixed resistance is the wash box, the drop in pressure across which is proportional to the rate of flow or rate of production.

The sampling device consists primarily of a pressure regulating governor, similar to that employed upon photometers; a differential pressure governor

Fig. 2

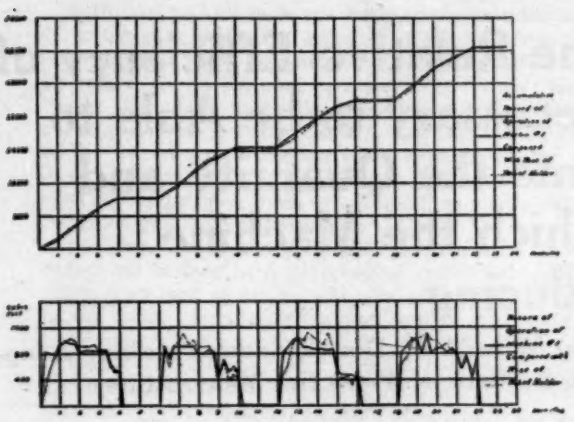

Fig. 3

Chart of Rate of Production on One Machine.

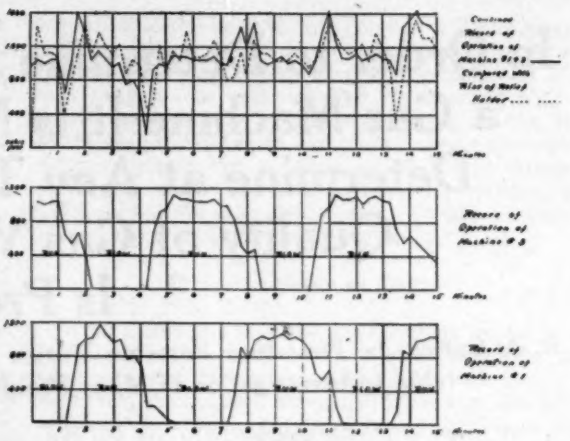

Fig. 4

Chart of Rate of Production on Two Machines.

which consists of a diaphragm directly connected to an adjustable orifice, a condenser, a purifier to clean the gas and a holder to collect the sample.

The movement of the diaphragm is actuated by the changing drop in pressure between the inlet and outlet of the wash or seal box. This diaphragm movement is resisted by a light spring the tension of which also serves as the means of adjustment of the device.

The size of the opening of the orifice is at all times in accord with the differential pressure, and the differential pressure is dependent upon the rate of flow or rate of production.

That the drop in pressure across the wash box is dependent upon and proportional to the rate of flow is demonstrated by the close agreement between the rate of make as determined by the device and by the rise of the relief holder, and the suitability of the wash box as a fixed resistance is thus established.

It is probable that a differential pressure gauge could be employed to indicate the rate of production by connecting it across the wash box and calibrating it to read in terms of rate of production.

It is probable, too, that one could go further and by integrating the instantaneous velocities, obtain a record of the production per run and per hour on each machine so equipped, but such a device would not serve as a means of recovering, for analysis, a sample of the gas produced, and it was in part to cover this last requirement that the device herein described was developed.

How It Works

The stream of gas passes through a condenser, purifier and scrubber, then through a pressure regulating governor, then through the adjustable orifice, and is collected in a counterweighted holder which is calibrated to read in terms of corrected make. (Figs. 1 and 2.)

During the blow the pressure at the outlet of the wash box is greater than at the inlet and the orifice is closed. The holder stands at zero. The instant the cap goes on, the pressure at the inlet to the wash box is greater than at the outlet and the orifice is automatically opened corresponding to the differential pressure, and a stream of gas passes through at a rate proportional to the rate of production—a rate decreasing as the run progresses till when the cap is lifted, because the pressure on the outlet of the wash box is the greater, the orifice is closed and the pointer on the holder comes to rest and indicates how much gas has been made. As the gas collected in the device is being run to waste during the next blow, a small sample is taken, which is analyzed in the same manner as applied to the total product.

Proving Its Accuracy

Many experiments have been made to demonstrate the accuracy of this little apparatus. First it was attached to a machine which was operating alone. A photometer meter was used in place of a holder and the readings, hour by hour, were compared with the corrected make according to the station meter. The ratio between the two was constant.

Next the exhauster was stopped and the rise of the relief holder was noted every fifteen seconds over a period of three runs. Readings were taken simultaneously upon the photometer meter, and the two curves plotted to a corresponding scale. As shown in Fig. 3 the contour is almost identical.

The important point to establish was whether or not this accuracy could be maintained with two machines in operation. In order to be able to take the measured sample from two machines at the same time, another device was made and placed upon a second machine. The two machines were run in step and simultaneous readings were taken on the two devices and the relief holder every fifteen seconds.

The curves in Figs. 4 and 5 show how closely the combined rate of make as indicated by the rise in the relief holder was followed by the sum of the readings of the two devices. Each device ran along minding its own business, following the performance of one machine but without a tremor as the other machine went on and off.

Subsequent experiments were all made with the small holder installed in place of the photometer meter. A scale divided in inches and tenths of an inch were noted and compared with the corrected make per run with one machine in operation. The scale was then converted to read in terms of corrected make and the make per run, averaged for one hour, was compared with the corrected station meter reading as follows:

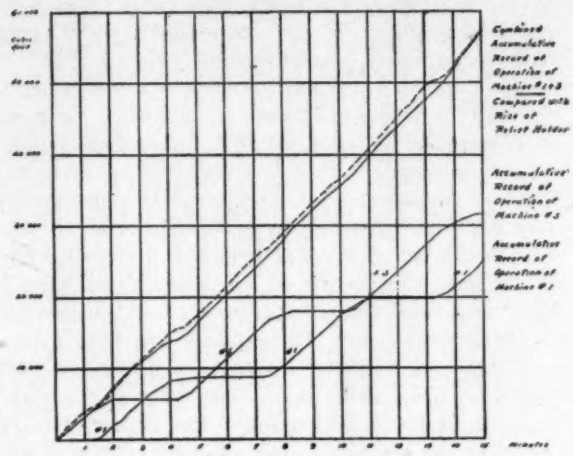

Fig. 5

Chart of Production on Two Machines.

Run Number.	Make as per Tester. Cu. Ft.
50	18,000
51	16,800
52	15,300
53	16,000
54	15,700
55	18,400
56	16,200
Total	116,400
Corrected make by station meter, same period	115,000
Difference	1,400
Error	1.2 per cent

It is interesting to note the adaptability of this device to the investigation of the many problems incident to water gas manufacture, and to the elimination of the guesswork heretofore unavoidable in the operation of a water gas generator house.

The schedule of up and down runs and the cycle of runs and blows, prescribed by however experienced a superintendent, are very largely guesswork, particularly in the larger plants and in plants where frequent changes in the fuel occur.

The intervals of time between coal-ups and between cleans, and even the number of hours a machine may run before recheckering, are prescribed on what has been found by experience to be good practice, but this interval, because of the constantly changing conditions, may be and we know that it is, too long in some cases and too short in others.

If a machine is still operating efficiently in quantity and quality of product even after 1,500 hours of operation, why recheckер it? It may run 1,800 hours. On the other hand, because of improper operation, it might be plugged up in 700 hours.

Sometimes, when a machine has not been properly cleaned or when fuel is bad, the make falls off after six or seven hours of operation, whereas, at other times it may operate efficiently for twelve hours.

Sometimes a plant will switch from all coke to all coal as fuel or it may, from day to day, vary the mixture of the two. The interval required between cleans is not the same for the two fuels, nor should the interval between coaling up be the same.

All of these points are susceptible of investigation with the device here described, and the performance of each individual machine can be followed, its relative efficiency can be studied, and the rule of thumb thus to a great extent, eliminated.

Through the employment of this device there are possibilities of scientific investigation which, particu-

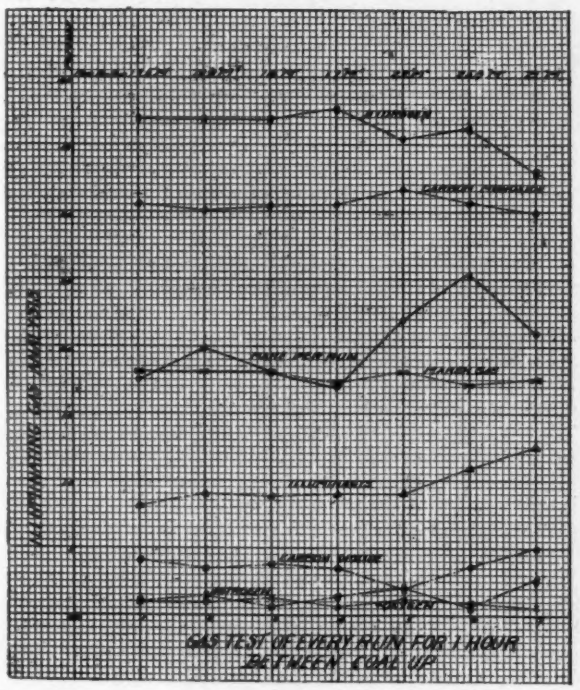

Fig 6

Analysis of Samples Taken Each Run

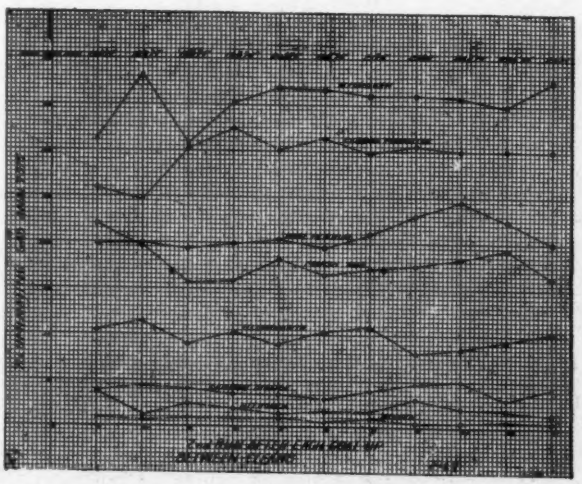

Fig 7

Analysis of Samples Taken Each Hour

larly in a large plant, have not heretofore been available.

In a plant where several machines are in operation, some machines will be blowing and others running. Those which are running may be at different stages of the run. One machine may have just been cleaned; another may be about due for a clean. One machine may have just coaled up, while another is just about to coal up. One machine may be about 100 hours old, while others may have run anywhere from 100 hours to 1,000 hours since rechecckering. A sample of gas taken from the main header will give the average quality of the gas, but the sample cannot be identified as characteristic of any one combination of conditions.

With this device a sample taken can be analyzed, and upon the record of the analysis can be noted not only the make of the machine on the particular run under investigation, but also what run, after cleaning and since coaling up, the sample represents.

A study might be made of the change in quantity and quality of the product of a certain machine on each run from one coal-up to the next, plotting the curve of each constituent of the gas. Fig. 6 shows the result of one such test; depending conclusions, however, could be drawn only from the average of a number of tests of this nature.

A through study of the changing performance of a machine between cleans might be conducted at any time as a means of determining the proper interval between cleans. The curves in Fig. 7 show the data obtained in one test of this nature, but in this case, too, a series of such tests would be required for definite conclusions. It might be possible to investigate also, if desired, the relative efficiency of two makers operating upon the same machine.

It is possible by hand control to take a sample of gas for any single minute or fraction of a minute of a run, thus determining the quantity and quality of gas made in that part of the run. From a series of such tests, curves could be drawn indicating the effect of various schedules of up and down runs, and of different cycles of run and blow.

In a large plant the cost of changes in the apparatus or in the method of its operation is excessive when conducted on all machines; on the other hand the effect of a change on one machine is lost in a investigation of the product of all.

Facility of investigating the effect of a change on one machine for determining the advisibility of applying that change to all machines would, I am sure, be welcomed by water gas engineers in general.

To be able to determine the quantity of gas each machine is making, and at the same time be able to take a sample of that gas at a rate corresponding to the rate of production, is to be able to control the results in a large plant just as though there were only one machine in operation.

Sulphur Content of Illuminating Gas

Industry Limited to Low-Sulphur Coals Until Purification Is Cheaper

W. W. Odell, gas engineer, and W. A. Dunkley, gas engineer attached to the Illinois Geological Survey, are authors of a paper entitled, "Removal of Sulphur from Illuminating Gas," which describes various purifying methods and gives the formula for each. The paper concludes with the following summary:

"The installation of purifying equipment is a heavy expense. Purifying apparatus of the present type requires considerable space, not only for the boxes themselves but for the storage and revivification of oxide. The cost and scarcity of labor in some communities make a less cumbersome process desirable. In view of these considerations, it seems as though the gas industry will be limited to the use of low-sulphur coals until a more convenient and cheaper method of purification has been worked out. Those plants that have excess purifying capacity are frequently able to realize good returns on their added investment by their ability to use coals somewhat higher in sulphur than customary when they are obtainable at a lower price. For example, several water-gas plants in Illinois and neighboring States are using local coals as generator fuel in place of coke and are realizing a saving, even though in some cases the sulphur to be removed has increased 50 to 100 per cent. In plants in which the purifying equipment is overloaded, the solution of the problem must rest on two considerations: First, the more efficient utilization of the present process, more attention being paid to the nature of the material used and the best ways of using it; and, second, the development of processes that will permit more economical gas purification and will perhaps make the sulphur in the coal a desirable by-product rather than a detriment."

In broaching their subject, they say:

"The sulphur content of coal is perhaps more important in the manufacture of illuminating gas than in any other coal-using industry. Whether the gas is made by the distillation of coal in retorts or ovens or by steaming incandescent coal or coke in the water-gas process, a portion of the sulphur present in the fuel always passes into the crude gas. Practically all the sulphur that remains in the finished gas is transformed into sulphur dioxide (SO_2) when the gas is burned. Sulphur dioxide is a pungent suffocating gas and, if present in the air in any perceptible amount, is deleterious to health and comfort and damaging to house-furnishings. So universally is this recognized that laws regulating the amount of sulphur that may be permitted to remain in the gas are very generally in force.

"The capacity of a plant to purify gas frequently limits the selection of coal for gas making. This condition may arise from different causes. Some plants were originally designed to handle a certain grade of low sulphur gas coal, and very little leeway was allowed for growth or for the use of inferior coals. Other plants, when built, had ample capacity to purify gas from relatively higher sulphur coals, but their purifying capacity is now limited and only the low sulphur coals can be handled.

"There is a great quantity of coal in the United States that would satisfy the requirements of the gas manufacturer were it not for the high sulphur content. The coals containing less than 1 per cent sulphur are becoming scarcer year by year and, in time, the gas industry will probably be compelled to use coals for gas making that are now considered out of the question."

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As the Journal Views It

The Judgment of the Rank and File

There are various kinds of applause. One kind can scarcely be termed a compliment; rather a commentary and the American's religious observance of the conventialities—he claps his hands lustily or cheers with vehemence at times when he feels the occasion requires it, not because he wants to applaud, but because he thinks he ought to.

The applause that greeted Mr. Cortelyou when he was introduced to deliver the presidential address at the American Gas Association, and that which interrupted his address when he alluded to the quality of the work of Colonel Fogg as secretary-manager, was the real kind of applause—the kind that indicated that, whatever the opinion of this or that individual or this or that organ, the work of these gentlemen in their association offices have met with the approval and appreciation of the rank and file of the association.

Those by whose volition and good-will they occupy their respective office have said "well done." Any further comment is superfluous.

That Scant Membership

It is difficult to realize with the memory of the standees in the auditorium at the first annual convention of the American Gas Association that the total number of active members does not compare with the aggregate membership of the former Gas Institute and the National Commercial Gas Association; that it does not reach one-fifth of what it should reach.

Unless the influence of the American Gas Association reaches out to and into the smallest hamlet supplied with gas—and everyone of them—unless it has therein at least one capable member actively cooperating with its aims, and feeling in no small way a responsibility towards their attainment the whole conception fails.

Up to the present, when we think of the American Gas Association, we do not reckon with practical things; we think, doubtless due to the influence of its leadership, in the inspirational sense. We do not view it, even after months of existence, as a concrete thing, but as an idea—an idea big in significance not only to the gas industry as a whole, but to each individual connected with it.

It must achieve its big membership before it gets down to routine ways, before we begin to look upon it as an institution rather than as an idea. Then the membership applications will come in in truly conventional batches. The real membership must be achieved while men can still be carried away by the enthusiasm for an idea engendered and instilled by a leader already "sold" himself on the bigness of that idea.

All presidents that may be elected in the American Gas Association will not have this ability. Few of them will take the office as seriously as does the present encumbent.

Mr. Cortelyou has proved a remarkably agreeable surprise to many of us.

We felt that his selection originally was a happy inspiration, but more as a lay figure than because of any constructive work of particular moment that he might accomplish.

He was nationally prominent. We felt that his name at the head of the list would reflect national prestige upon the gas industry.

It hasn't been so long since gas men's interests began and ended at the boundaries of the cities they served. Even their rates were settled within such limits.

We had become accustomed, without discredit to ourselves, to think locally.

Mr. Cortelyou was not an old-timer in the gas field. He had created no enmities in the gas field. Many might not know him, but none would have an object in hampering the success of his efforts or reluctance in offering him co-operation.

He had not been brought up in the groove we had almost been forced into.

And the time has come when each gas company is more or less of a national factor. The limits of its mains are no longer the limits of its interests or its responsibilities. It must think nationally, and the American Gas Association must educate it in such channels of thought or fail in its missions.

But Mr. Cortelyou has proved a constructive figure beyond all expectation. He has demonstrated before our eyes, without actually telling them to us, the reasons underlying the stenographer's elevation to the office of Secretary of the Treasury of the United States.

To-day he is manifestly the most popular figure in the gas field. They make a noise about him when he speaks, they laughed with him when he essayed

a bit of humor about his response when given an honorary degree at a Western university, which we, as a writer didn't think anything special since we are sure we've said brighter things than that ourselves and no one even smiled.

Mr. Cortelyou, we are certain, if he set himself to writing circulars, could bring the members in. And he would set them to chasing ideals when he got them.

But to ask this would be a most flagrant imposition.

But there is nothing to prevent those whose responsibilities are to perfect such details from studying their leader's ways and words, and thereby get the ammunition for a membership campaign, a new kind of membership campaign, that will bring them in.

Say less, for example, of how much a member is getting when he gets the Monthly Bulletin, and more about the fundamental ideal of the American Gas Association, its immense potentialities for the uplift of the industry and the individual.

And whatever is said, let it be said in a way that inspires, that rouses to an enthusiasm to give service. Don't just write copy.

Straight from the Shoulder

We rather liked Francis H. Sisson's address before the American Gas Association, which is abstracted elsewhere in this issue. It was different from what we have been accustomed to and naturally expected.

For example, when he began to trace the origin of present established rates:

"Valuations and capitalizations usually are what they happen to be," he declared.

We began to sit up and take interest. Our own views entirely.

"Even when fixed judicially, or determined by quasi-public agencies like State commissions, they seldom have a patent for accuracy or equity," he charged pointblank.

We began to glow. That was hitting them!

"Where they have been fixed by politicians, or that elusive thing called public opinion, they have usually been ungenerous and unfair," was the assertion that assured him completely that his audience was with him.

Another authority had spread balm on our injured feeling. Again after many rebuffs we were the sorely outraged gas man, always abused by others and never wrong ourselves.

But then came this: "Where they have been fixed by unrestrained action of the companies, they have been all the traffic would bear."

Sound common sense essentially, but not of a kind with the thoughts we have been coddling ourselves with and have been coddled with by other outsiders speaking at our conventions.

The age behind has been an age of rapidly accumulating selfishness. The public thought only of the public. The gas company only of its promoters. The latter being the most consolidated and shrewder most frequently prevailed over the former. The former beaten continually at craft began to substitute unreasoning force. And we are in a merry muddle.

The age ahead is an age of service and fair play. The gas companies have already sensed this, realize that their very existence depends upon its incorporating such principles in their policies.

The task ahead is to make the public realize the changed attitude. This accomplished the public's will not be an attitude of stand-offishness. It, too, senses the inclination towards seeing the other fellow's side and fair play.

The Testimony of One Who Has Produced

No one is so convincing as one who has on his own account proved the soundness of his theories by the results he has produced.

N. C. Kingsbury appeared before the American Gas Association plentifully supplied with checked results that confirmed the admonitions he offered in generous spirit to a branch of the utility field no less important than his own, but nationally less well known and locally as a too general thing held in less enviable repute.

This is not to say that all men speak well of the telephone company, that none are ever vexed at its service.

But the opinions we express of the telephone company are sporadic. The low esteem in which we place its operators is dispelled that same evening through the understanding we gain from the page of the first magazine we open up for relaxation.

Opinions formed as to the gas company become deeply implanted through lack of effort to correct them.

The acts attributed to the telephone company we merely sour at as sins of omission. Those of the gas company create bitterness because they are stamped as sins of commission, deliberately plotted and satanically executed.

There are points in Mr. Kingsbury's paper that those who seek flaws in his argument will eagerly pick up.

The most apparent is his attributing the growth in number of telephones in the United States as compared to European countries to advertising.

This affords us a grand opportunity to give vent to our old shout; the extravagance of the American in buying the good things to-day in total fearlessness of what the morrow may hold forth bred of our self-confidence—our pioneer spirit.

We will point to the automobile, and we will thereby

involuntarily prove the soundness of Mr. Kingsbury's deductions.

What made possible the vast distribution per capita of the automobile in the United States? Advertising more than anything else.

What has caused more ravaged gums on the part of America's none too responsive youngsters than any other cause? Education of their mamas as to the evils and injuriousness of unclean teeth; an education accomplished primarily by advertising.

What has sent millions of us scurrying to the oculist's at the first appearance of black spots? Educational advertising.

We are the most educated people in the world in the general sense. And this is not due alone to our free schools. A vast part is due to advertising.

Since attaining maturity we have learned more about our "innards" and our "outwards" from the bought page in the magazine, from the highly colored card in the street car and from the billboard along our highways, than we ever learned from our textbooks in our minority.

The gas industry has not advertised nationally, yet has endured and has attained tremendous magnitude. How much greater might we not have been had we employed to the extent the telephone company has the force of national advertising.

Can Be No Market for Utility Securities Until Satisfactory Credit Standing Is Restored

(*Continued from page* 346.)

of public generosity or carelessness and been dwarfed and stunted during intervals of public unreasonableness or indignation.

Labor's Attitude Vital

But the credit of public utilities cannot adequately be restored until the employees of these corporations understand and acknowledge that they are under as distinct and grave responsibility to the community and the public at large as are the guardians of the peace and safety of a community or the country. So long as labor persists in its attitude of "the public be damned," and continues to throw a wrench into the economic machinery of the nation by unwarranted strikes—some of which, as we witness to-day, are called by internal dissension in unions now in the throes of a battle between the radical and conservative elements—labor will not only impair the credit of public utilities, directly or indirectly, but will also financially penalize itself, even though it may win unjustifiably high wages, for every strike reduces the nation's productivity in some degree and the only solution for the high-cost-of-living problem is greater production.

Of what avail is it for labor to gain the right of collective bargaining if there are no responsible bodies of workingmen who can be bargained with collectively and who will honor and execute contractual obligations, instead of considering agreements solemnly entered into with employers as mere scraps of paper to be thrown to the wind at the instigation of anarchistic agitators? Organized labor must purge itself of the dangerous revolutionary element now poisoning it.

Until labor comes to its senses the credit and prosperity of public utilities, in common with those of all other industrial and commercial interests of the country, will be seriously jeopardized.

The Need for Political Intelligence

There is equal need also for a realization by our legislators of their duty toward the public utilities and the holders of the securities of these companies.

Business opportunity means nothing unless we have coupled with it political intelligence which makes it possible of full realization. We look into our own city here, and we discuss the cost of transportation and the economic problems that are involved in public utility problems generally; but of what good is the understanding of the economic problems if we have sitting in legislative and administrative halls a degree of political intelligence that absolutely nullifies it, which defies economic law, which refuses to recognize cost of production and cost of service as a basis of price?

We must consider more than the earning power, or franchise terms, or business opportunity, or the trade development that may follow in any given field; we must consider the political angle which, sooner or later, in our form of government determines the value upon which any security rests. We see rising up all over the world this tide of radicalism, which has affected every form of business opportunity and business service; and unless we, as business men, attempt to understand and interpret, and, by the grace of God, guide that radicalism into right channels, it is going to affect the fundamental values in which we all deal.

We cannot expect to take our position in the economic world unless we put into political halls the same kind of intelligence that enters into our business organization.

The political angle is having a very important effect upon our business future, and we, as business men, should study that angle and have intelligent opinions about it and be able to vote, through our duly accredited representatives, intelligently, that our business may be protected and conserved.

Cities cannot be prosperous without efficient utilities; and utilities cannot be efficient without prosperity. Public regulation involves public protection of credit.

In the final analysis, therefore, the creation of a market for public utility securities is dependent upon whether the public can, through intelligent discussion of the problems involved, be made to see the necessity for according immediate relief to the utilities, or whether the public must see the reason for and grant this relief only after further painful experience with decreased and impaired public service.

I am sure that the American Gas Association will do all in its power to help make the public understand all the facts. And if that is accomplished, I have faith enough in the intelligence and spirit of fair play of the American people to believe that the gas companies, in common with all other public utility corporations, will enter upon their greatest era of usefulness and prosperity—and there will no longer be any question as to how a market for public utilities may be created, for it will create itself.

Vertical Retorts Lend Themselves to Steaming with Better Results than in the Case of Horizontals

L. J. Willien, Jr., Discusses the Process in Retorts of Various Types—Experiences in the United States

The introduction of steam into vertical retorts has been practised for more than 30 years in the shale oil industry in Scotland, where the oil contained in the shale is driven out by passing the shale through vertical retorts, explained L. J. Willien, Jr., in a paper on progress to date in steaming retorts, presented at the annual convention of the American Gas Association. By introducing steam at the bottom of the retorts and allowing it to pass up through the shale, the last traces of oil are driven out and some water gas is formed by reaction with the carbon that was necessarily formed by the oil distillation. The water gas is used for heating the retorts.

The original patent taken out for the Dessau verticals by Dr. Bueb specifies that the process of carbonization involves the introduction of steam through the bottom of the retorts during the last stages of the carbonization period, for the purpose of making water gas. This has been the usual practice wherever the Dessau verticals are used.

It has been common practice in the operation of the continuous vertical retorts, to introduce a small amount of steam into the coke hopper at the bottom of the retort, to cool the coke; some of this steam passes up through the retorts and forms about 10 per cent of water gas.

The advance in the cost of labor and material together with an increased demand for gas which was caused by the world war, forced the gas engineer, especially in England, to seek some means of increasing the amount of gas obtained from a unit of coal.

The steaming process was the most promising as it could be put into practice at a comparatively small expense of time and money, and was particularly adaptable to the continuous type of vertical retort. So the steaming process was adopted by several of the gas companies in England with the result that some remarkable results have been obtained, and the indications are that steaming will be continued in the future as far as the English gas companies are concerned.

Very little work has been done in the United States on the steaming process, principally because the gas companies are handicapped by having to meet either a candle-power or an unusually high calorific standard.

Intermittent Verticals

As stated above it has been a common practice in the operation of the Dessau vertical retorts to introduce a small amount of steam during the last stages of the carbonizing period. Generally the steam is introduced at the bottom of the retorts during the last two hours.

Settles Downward Steaming Process

In the process as applied to any type of vertical retort, the universal practice is to allow the steam to pass up through the retorts. A process has been patented in England within the past two years which involves introducing the steam at the top of an intermittent vertical retort and having it pass downward. This process is known as the "Settles Downward Process" for intermittent vertical retorts. A sketch of a setting equipped for this process is shown in Fig. 1, the operation of which is as follows:

The bottoms of two retorts are connected with a 3 or 4 in. connection. During the last three hours of a twelve hour carbonizing period, the flow of gas from the top of one of the retorts is discontinued by means of a valve in the take-off pipe and superheated steam is introduced into the top of the retort. The steam passes down through the hot coke in the retort. The water gas thus produced passes at once to the bottom of a freshly charged retort through the 3 or 4 in. connection, sweeping the rich gases out along with it and protecting them against decomposition. The steaming is therefore downward, but the active work of the resultant water gas is upward. The steam in its descent and in its conversion sweeps the residual gases from the coke; in the freshly charged retorts the diffusion of the blue water gas creates a new atmosphere, hastens the evolved gases from the fresh charge, protects them, and at the same time the water gas itself is carbureted.

The vertical retorts at Turo, England, were equipped for the "Downward Steaming Process." The retorts are 13 ft. long, end to end, and taper evenly from a section of 27 by 14 in. at the bottom to 22 by 9 in. at the top.

The advantage of the highly heated upward current of blue water gas at the beginning of the carbonizing period is a dilution of the rich gases without absorption or loss of heat and a greatly accelerated rate of travel towards the gas outlet, resulting in a reduction of the secondary action due both to the protective influence of dilution and to exposition for a shorter time to a decomposing atmosphere. Consequently the proportion of pitch in the tar falls below 40 per cent, and the production of ammonia is increased 30 per cent. There is a remarkable decrease in the temperature of the gases and vapors at the exit from the retorts. This temperature, which was found to be about 130 deg. Fahr., prevents the deposition of ammonia salts in the hydraulic or foul main. The prolonged steaming completely washes out the residual gases from the coke, as shown by the high hydrogen and menthane content; and analyses of the gas suggest a wide field for study as to actions and reactions that take place when the rich gases from earlier hours of the carbonizing period are diluted with blue water gas from a spent charge.

Steaming Horizontal Retorts

Horizontal retort settings are in a great majority and are considered by gas engineers as the best for carbonizing certain classes of coal. Most of the plants

operating horizontal retorts are very desirous of realizing any economy that can be secured from them.

Horizontal retorts do not lend themselves to the steaming process as readily as do the vertical retorts. The initial attempts at steaming with the horizontal retorts resulted in a great many failures, due chiefly to missing some of the necessary details. In the development of steaming in vertical retorts, success was due only to patient investigation with a view to arriving at proper conditions, and where the work of steaming in horizontal retorts has been carried out in a scientific way, good results have been obtained, but not the results that are possible with the vertical retorts.

The conditions inside of the horizontal retorts are entirely different from those of the vertical retorts, therefore the methods that apply to the steaming of verticals are not applicable to the steaming of horizontals.

Steam cannot be introduced continuously into a horizontal retort, as the comparatively shallow depth of semi-carbonized coal or partially incandescent coke in an incandescent retort will cause an enormous increase in the production of carbon dioxide. With proper apparatus and methods the carbon dioxide can be kept within a 5 per cent average. While this is higher than the average maintained with continuous verticals, it is not a serious thing where the gas is required to meet a calorific standard. The fact that the charges in the horizontals cannot be steamed continuously deprives them of the advantage of a change in gaseous atmospheric condition. The hydrocarbons, too, are not accelerated and protected from decomposition in their departure from the retorts, nor is there the additional hydrogen to pick up some of the remnant volatile matter from the coke.

A simple method of steaming stopped end horizontal retorts was described in a paper read by Mr. Waddell before the Scottish Junior Gas Association in April, 1919 (*London Gas Journal*, April 22, 1919, p. 194).

His first attempt at steaming charges in horizontal retorts was made in July, 1918, with very encouraging results. In the first experiments a superheater was in one of the gas flues underneath the bottom of the retorts. This proved to be expensive as frequently insufficient steam passed through it, resulting in its burning out. The steam was introduced into the retorts by means of a perforated pipe inserted through a hole in the retort lid. A tapered plug was screwed on the end of the pipe, so as to form a joint between the lid and the pipe. The connection to the steam supply was made with a union coupling. The whole apparatus could be easily connected by the stokers. The retorts were charged full from back to front, and after eight hours the perforated steam pipe was inserted. At first there was a tendency to have an excess of steam, resulting in the usual reduction in the temperature of the retort and in weakening the ammoniacal liquor. It was also noticed that the body of the coke did not fall in anyway for 3 ft. in the front part of the retort, which made it difficult to draw the charges. The latter trouble was undoubtedly due to the low temperature of the incandescent coke in the front of the retort, and therefore the desired chemical action did not take place.

After the above experience, 7/16 in. holes were drilled into the pipe at 4 in. intervals and staggered as well, only to within 3 ft. from the mouthpiece. The retorts instead of being charged full from back to front, were gradually tapered off 4 ft. from the front of the retort. Discs were placed on the outlet sides of the steam valves with a hole bored in them, and a steam reducing valve placed in the supply pipe to the retorts, set at 40 lb. These changes gave much better results. The steam supply to each retort was constant and could not be tampered with in any way. Reducing the steam pressure from 60 to 40 lb. and increasing the size of the holes in the pipe resulted in the steam having a lower rate of travel and being more evenly distributed over the retort, thus increasing the contact with the hot coke in the retort. The perforated pipes last for four or five weeks with proper care and attention.

The following results were obtained:

Gas made per ton:
With steam .....12,020 cu. ft.
Without steam .....10,530 cu. ft.
Per cent increase—14.2

Tar and liquor sold per ton:.
With steam .....49.01 gal.
Without steam .....43.60 gal.
Per cent increase—12.4

Coke sold per ton:
With steam .....1,008 lb.
Without steam .....1,120 lb.
Per cent increase—9.9

Mr. Waddell also states that he had a bench of four retorts which was being renewed and that it was proposed to introduce the steam at the back, which he believes has several advantages over the system he describes. In the first place, the upkeep of the pipe is eliminated. The steam by entering at the back comes in contact with the coke, which is in the hottest zone of the retort, and therefore the desired chemical action will be more rapid and complete. The steam can probably be turned on six hours after the retorts are charged, thus resulting in the water gas passing through the partly carbonized portion of the charge in the front part of the retort and thereby picking up the hydrocarbons, or, in other words, scavenging this portion of the charge.

R. J. Rew, of Exeter, England, has developed a process of steaming horizontal retorts which is somewhat different from the one used by Mr. Waddell. This process consists in taking two retorts in a bench of sixes or eights and at the end of an eight-hour carbonizing period steaming the spent charges for forty hours.

It is preferable that the retorts be of special construction. This special retort, which has been patented, is shown in Fig. 2. It does away with all obstructions on the inside and gives the highest effective superheating to the steam at the right moment. The insertion and withdrawal of the charge is as easily accomplished as in ordinary practice, and the existing mouthpieces and ironwork can be utilized.

The amount of water gas produced in the special retorts is increased and any risk of the steam short-circuiting is reduced to a minimum. Two special retorts in a setting of sixes or eights would in most cases give the necessary percentage of water gas. The same retorts are kept on water gas production continuously, except for the eight-hour carbonizing period every other day.

The make of water gas by this process in retorts 21 ft. by 15 in. by 10 ft. has varied at different works

from 3,000 to 13,000 cu. ft. per retort per day, but the average of these figures may be considered a good output, having due regard to a moderate carbon-dioxide content. The percentage of carbon dioxide can be kept within a 5 per cent average when tested in the purified water gas.

To obtain these results the coke in the retort must be kept in a complete state of incandescence during the whole forty-hour steaming period. The admission of superheated steam has but little effect on the temperature of the retort and nothing like the rapid reduction that a charge of coal would produce. The wear and tear on the retort itself is, therefore, less severe, and this advantage is helped by the reduction in the amount of drawing and charging and the total absence of carbon removal. Any reduction in temperature by an oversupply of wet steam immediately renders the make of good water gas impossible and carbon dioxide is produced in such proportions that, as a diluent, the gas added is very little better than the furnace gases or air. There is a constant tendency to oversupply steam or water, and this invariably happens in the initial attempt to adopt the process. It is difficult for the average engineer to realize how small a quantity of either is required, and practically all past failures can be traced to one or both of these points.

The use of wet steam is also fatal to good water gas production in horizontal retorts, if brought into direct contact with the incandescent coke, and some form of superheating is essential—the idea being to bring the dry steam into contact with the incandescent coke at about the same temperature as the coke itself. Otherwise the body of fuel is so shallow that the chemical reaction necessary to produce carbon monoxide is rendered doubtful and of short duration. So important is it to obtain the highest possible temperature for the superheated steam that the travel between the superheater and the retort must be kept as short as possible, because each foot makes a large difference. Whatever may be said concerning the relative advantages of dry or highly superheated steam for verticals, there is no doubt as to the necessity of the latter for horizontals.

The forty-eight-hour period between the insertion and withdrawal of the charge in the steamed retorts has an important bearing on labor, which is obviously only one-sixth or one-eighth of the work required for coal-gas production. Assuming that a bed of six retorts is in full operation on six hour charges, it means charging 168 retorts per week; but if two of them are steamed, it reduces the charges to 118 a week, the two steamed retorts only coming out three times a week.

Steaming with Continuous Vertical Retorts

Of all the various types of retorts and systems of coal carbonization, the continuous system of coal carbonization in vertical retorts is the most favorable for steaming. In the case of the intermittent vertical retorts, the carbonization proper is completed before the steam is introduced; this practically means that the retort is used as a water gas generator. In the continuous system the production of water gas is carried on without interruption of the ordinary process of dry distillation; or, in other words, the water gas is produced "in situ."

It has been largely in connection with the continuous vertical retorts that steaming has been used and the best results have been obtained. Most of the gas companies in England that operate the continuous verticals have adopted steaming as regular practice.

While a great many articles have appeared in the English gas journals on the subject of steaming, there are two papers which should be read by anyone who contemplates steaming. One of these was written by J. E. Blundell, of the Macclesfield Corporation, and the other by John West.

The following is an abstract of Mr. Blundell's papaper. The retorts used were of the Glover-West continuous system. In the ordinary system of working the retorts it was customary to concentrate the highest temperatures in the upper combustion chambers in order to carbonize the coal quickly and surround it with a jacket of coke, so that the contraction of the coke, on further heating, would facilitate the descent of the charge through the retort.

For the satisfactory production of water gas, it would be necessary to increase considerably the temperature of the lower combustion chambers because if this were not done the complete water gas reaction would not take place and there would be a considerable increase of the carbon dioxide in the gas. But it was thought that if the lower combustion chambers were kept at a sufficiently high temperature (say 2,460 deg. Fahr.) then the coke and scurf carbon would be hot enough to complete the water gas reaction, so that there would not be any appreciable increase in carbon dioxide in the resultant gas.

The above theories were put into practice by raising the temperatures in the lower combustion chambers to between 2,372 deg. Fahr., and 2,552 deg. Fahr. In order that the body of the coke in the retort should become sufficiently heated for the water gas reaction to take place satisfactorily, it was necessary to reduce the speed of the coke extraction about 10 per cent. When this was done it was found that the production of water gas took place satisfactorily and to an extent which allows the gas to be diluted until it has the required B.t.u.

In the usual method of working, it had been the custom, as far as possible, to work with a slight pressure on the outlet of the retorts in order to avoid drawing in air and furnace gases. During these experiments with steaming it was found that the make of gas per retort was considerably increased, and as a consequence of this and of the fact that the outlet valves and pipes could not be correspondingly increased in area, it was found that in order to work with a level gauge at the top of the retorts, it was necessary to maintain a slight pull on the inlet of the retort house governor.

Special attention had to be paid to the regular and systematic cleaning of dampers and flues. Particular attention had to be paid to the regular cleaning of chimney dampers and waste gas dampers of the individual combustion chambers. If this was not done at least once a month the heats would drop and cause an appreciable increase in the carbon dioxide of the gas.

In maintaining the regular heats, instead of working the producers by the usual method of closed doors and a limited supply of primary air, a method suggested by John West was used, in which the amount of air drawn through the producer is regulated by means of the

dampers on the outlet flues. Working in this way, the producer clinkering doors are wide open, or taken off, and the main producer gas dampers on the outlet of the producers at the base of the producer gas uptake flues leading to the combustion chambers are regulated to allow just the necessary amount of producer gas to be drawn through.

The advantages of this method of working are:

1. A steady supply of producer gas is maintained throughout the whole 24 hours, the operation of cleaning the fires making no appreciable difference in the volume of air drawn through the producers. Under the old method an amount of producer gas at a low temperature, largely in excess of the volumes required for heating the settings, was drawn through whenever the doors were opened for cleaning the fire. This excess of gas frequently burned at the top of the chimney.

2. The heats in the settings are constant.

3. Less coke is used, since there is no waste due to the rush of air through the producer during cleaning operations.

4. The temperature of the producers does not become excessive at any time and less clinker is formed.

5. Owing to the checking of the main producer gas dampers, a slight pressure is maintained in the producer so that no air is drawn in around the firing door lid.

Lawrence Hislop, of Uddington, England, has probably done more thorough investigation on steaming than anyone else. His investigations have included sending the gas thus made out to the consumers to ascertain the results obtained under everyday working conditions. While none of the results obtained have been published, yet at an informal meeting of the Scottish Gas Managers held in April, 1919, Mr. Hislop stated that in March, 1919, he manufactured 30,000 cu. ft. of 400 B.t.u. gas per ton of coal handled. The average of the inerts was under 12 per cent, the average naphthalene 1.2 grains per 100 cu. ft. and the average sulphur 7 grains. He assured all interested that in every direction of use the gas gave complete satisfaction to the consumers. The sale of coke was a little over 30 per cent of the coal.

Dempster-Toogood System of Continuous Verticals

In this system the retorts are 25 ft. 6 in. long; the heating gases are ignited some distance down from the top of the retort and burn downward. The products rising from the bottom flues of the retort are regenerated at the extreme top of the retort by the incoming cold coal.

Many interesting results were obtained during a steaming test on this system made by Tim Duxbury bury at the Central Gas Works at Oldham, England. at the Central Gas Works at Oldham, England. This particular setting when installed in 1913 was rated and guaranteed to produce 12,500 cu. ft. per ton of coal.

The results disclose the following:

The yield per ton increases as the throughput per retort decreases. The steam bears no ratio to the yield or output; rather does it appear that the smaller the throughput the hotter the coke and the greater the capacity for water gas production—there being a critical balance between the whole when the B.t.u. in the blended gas stands at a maximum.

Steaming in America

There has been little work done in America with the steaming process. Steaming has not been used more extensively because of legal restrictions on quality of the gas, which are such that steaming is out of the question. In many places candle-power restrictions are still in force. Even where the calorific standard is in force, the calorific value when required is so high that the gas companies in many instances have trouble in meeting it. Any standard above 600 B.t.u. will not permit steaming; neither will a candle-power standard permit it.

As far as it was possible to determine, there are about twelve gas plants in this country that have made attempts at steaming. They are made up as follows:

Intermittent verticals	2
Inclined retorts	1
Horizontal retorts	3
Glover-West continuous verticals	3
Woodall-Duckham continuous verticals	3

Data were obtained from only six of these plants; one plant operating the Glover-West system gave it up as being of no value.

One plant operating through horizontals experimented a little by steaming one bench. While it was impossible to determine whether there was any increase in the amount of gas made, there was an appreciable decrease in the amount of carbon deposited on the sides of the retorts as well as a considerable improvement in the stoppages in the standpipes.

Springfield Tests

In March, 1917, some special tests were made on steaming the Glover-West vertical retorts at the Springfield Gas Light Company, Springfield, Mass., in connection with the investigation made by the Massachusetts Board of Gas and Electric Light Commissioners relative to the adoption of a calorific standard for gas.

One unit consisting of twenty-four retorts of the Glover-West continuous system was equipped with steam connections and operated a week without steaming and a week with steaming; the coal used throughout the test was of a uniform grade.

While the steaming was continued after the termination of the tests, the results obtained did not continue as good as the tests showed. This was due to the mixture of different grades of coal that was used. A uniform grade of coal is essential for the most efficient operation of the continuous vertical retorts for the reason that for any given grade of coal there is a certain ratio between the heats carried and the rate of travel of the coal through the retorts, which must be maintained in order to obtain the best results. There are some grades of coal in this country which, it seems, are impossible to carbonize with the continuous systems. As Springfield was forced to use about 10 different grades of coal, it was impossible to obtain very efficient results.

In April, 1919, an eight day test was made on a spe-

cial grade of coal, during which steam was used. A yield of 15,000 cu. ft. of 547 B.t.u. gas was obtained. During the balance of April, only one other grade of coal was used, or for the whole month only two different grades were used, there being no mixtures, and the yield for the entire month averaged 15,300 cu. ft. per ton of 538 B.t.u. gas.

The Portland Gas Light Company

The gas company at Portland, Maine, submitted some figures obtained with steaming Glover-West continuous retorts.

Pawtucket Gas Company

The Pawtucket Gas Company at Pawtucket, R. I., conducted some steaming tests on an installation of Glover-West retorts. While the results were not positive, the company obtained an increase of about 9 per cent in the gas production, and was only able to account for 30 per cent of the steam used as going into the additional gas made. The results indicated that the cost of the steam used exceeded the benefits derived.

Holyoke Gas Company

About two years ago the Holyoke Gas Company, Holyoke, Mass., experimented for about one month by steaming two benches of 8 retorts of the Woodall-Duckham continuous type, but was obliged to discontinue the experiment because of tearing out the benches.

It was unable to determine whether any increased gas was made, as the gas from these retorts was not measured separately. The experiment was not considered successful on account of the excessive drippings, due to the steam not being superheated, and to faulty heats at the bottom of the retorts, which the company was unable to correct at that time. It reports, however, that it intends to resume steaming very soon on all of its retorts.

Mohawk Gas Company

The Mohawk Gas Company at Schenectady, New York, reports that it has been steaming its Woodall-Duckham continuous verticals for some time and estimates that they produce from 12 to 15 per cent blue gas. The tar production seems to be increased, while the B.t.u. of the gas is reduced about 5 per cent.

Two other gas companies that are steaming promised to submit some data on the results obtained, but the reports were not received in time to be included in this paper.

Action of Steam in Retorts

The opinion of many in regard to the theory of steaming is that the steam reacts with the incandescent carbon forming blue water gas. While that is largely true, an examination of the results that have been obtained, shows that secondary reactions occur. The production of blue water gas alone will not cause an increase in the tar and ammonia yield.

The theoretical considerations applying to the steaming process were given by Prof. J. W. Cobb in a lecture delivered to the North British Association of Gas Managers in September, 1918, as follows:

The admission of steam for the conversion of water gas and its pressure helps to drive off and to protect the hydrocarbons before they can become degraded or destroyed, and the hydrogen, through its diffusive power of penetrating into the charge, picks up a large part of the volatile matter which would remain in the interstices of the coke and carries it off. In this way we see why the make of gas can be so greatly enlarged without the gas depreciating much in quality. Laboratory experiments have also shown Professor Cobb that while nitrogen is no friend of benzene, hydrogen is. Nitrogen favors its decomposition; hydrogen limits it up to a certain temperature below ordinary retort carbonizing. Steaming also tends to a higher yield of ammonia.

In the development of the charcoal that was used in the gas masks it was found that the charcoal produced by the ordinary distillation process contained impurities in the form of hydrocarbons which lodged in the pores, thus materially affecting the absorption of the different war gases. In fact, the charcoal would not absorb some of the gases at all. It was found, however, that by heating the charcoal to about 750 deg. Fahr. and passing air through it the hydrocarbon impurities were oxidized or driven out of the pores and the absorption power of the charcoal greatly increased. Further experiments made by heating the charcoal to about 1,800 deg. Fahr. and passing steam through it showed that a more thorough removal of the hydrocarbon impurities was obtained, with the result that its power for absorbing the different poisonous gases was even higher than that of the air-treated charcoal. This process was known as the "steam activation process" for activating charcoal.

This is practically identical with the steaming process as applied to coal carbonization, and the results that have been published seem to indicate that the action of the steaming during the carbonization of coal is the same as in the activation of charcoal.

It is unlikely that any great amount of steam penetrates very far into the center of a mass of incandescent coke in steaming vertical retorts. The majority, if not all of it, passes up around the sides of the retort, resulting in the water gas reaction taking place between the steam and the carbon on the sides of the retort and the coke nearest the retort walls.

Effects of Steaming on the Retorts

The question of wear and tear on the retorts due to steaming has been raised by some gas engineers, who claim that it must be greater because of the deterioration of the linings in the generator of a water gas machine. All the results that have been published on steaming tend to show that the wear and tear on the retorts is considerably reduced, since the frequency with which the retorts have to be scurfed is about 50 per cent less with steaming than without; then, too, the carbon that is deposited on the sides of the retorts has a less density and is more easily removed than the carbon formed without steam.

In regard to comparing a retort that is being steamed to a generator of a water gas machine, there is no comparison at all, as the operating conditions are entirely different. In a retort the temperatures

(*Continued on page* 386.)

Threatening as It Does to Submerge Us in a Field We Have Hitherto Deemed Our Own the By-Product Oven Looms Up as a Serious Factor in the Gas Business

A. H. Harris, Jr., Provides Facts on Matters We Have Hitherto Contented Ourselves with Surmises On—Filling in the Gap Left by Diminishing Natural Gas

The by-product oven industry cannot help but have a tremendous bearing upon the gas business, carrying on, as it does, on a very much larger scale, the selfsame reactions that take place in the numerous horizontal and vertical retorts of the gas plants, declared A. H. Harris, Jr., in an American Gas Association convention paper. It is true that the gas from the majority of the ovens throughout the country find its way into the open hearths, soaking pits and similar furnaces in the steel mill, but the other by-products, tar, sulphate and light oils, form volumes so great that the gas engineer is beginning to look at them with bulging eyes, and wonder what he is going to do about it.

Capturing a Market the Gas Man Considered His Own

On Jan. 1, 1919, there were 9,940 by-product ovens in operation in the United States, with an annual coal capacity of 50,024,000 tons and a coke producing capacity of 36,840,200 tons. Under construction at that time were 1,620 additional ovens which will probably be in operation before the close of this year. This will increase the coal consumption to over 60,000,000 tons and the coke production to about 44,000,000 tons, yearly. These figures are based upon the rated capacity of the various plants and it is very probable that the consumption will not be fully realized. However, during the year there should be produced approximately 420,000,000 gal. of tar, 60,000 tons of ammonium sulphate or its equivalent, and 180,000,000 gal. of light oil—practically running away with the by-product production which, up to the past few years, the gas man considered all his own.

These are truly stupendous figures, and the gas engineer, and indeed the other gas company officials, will find it to their advantage to analyze them very closely, investigate the various markets, uses and advantages of sulphate of ammonia as a fertilizer, of tar as a source of dyestuffs, medicines, preservatives and road and roofing binders, of cyanogen as Prussian blue and in metallurgy, and of benzol as a motor fuel. They will greatly influence the future cost of gas in the holder. However, since much has been written and said about these various products, by men intimately connected with them, they will not be further discussed here.

Natural Gas Substitution

Looking ahead a bit, another very interesting field for the by-product oven in the gas industry is the replacement of natural gas by that from by-product ovens. There is no question but that the natural gas supply of the United States, especially in the Appalachian field, is rapidly diminishing, and while stringent conservation by producer and consumer may nurse this supply along for another decade, it will eventually give out, or nearly so, and some other gas must take its place. This question was the main topic of discussion at the May meeting of the Natural Gas Association in Cleveland, and the engineers there present seemed to be of one mind on the need for conservation. Failing in this, they spoke of replacing the natural gas with artificial gas, but no definite plans as to just how this would be done, were discussed in the meeting.

The economic problems to be solved in such a replacement are vast indeed, and it is not beyond the possibilities to have, in the not very distant future, enormous by-product plants constructed at or near the coal mines, the coke thus produced eliminating almost entirely the beehive product of the eastern section of this country and competing very strongly with anthracite coal as a domestic fuel. The gas from these plants will be pumped into the existing natural gas mains; the tar will be consumed in the dyestuffs and associated industries, a large offshoot of which will be the disposition of the quantities of pitch remaining after the various dyes and lighter oils are extracted from the tar; the sulphate of ammonia will be marketed throughout the world on a much larger scale than at present, and the 90 per cent benzol will form a very excellent motor fuel and a strong competitor of gasoline.

Possibly some arrangement will be made with the Government partially to subsidize these plants, so that, should this country ever again have to step forward in the defense of democracy, their entire light oil production, at almost a moment's notice, can be turned into the main ingredients of high explosives, the necessary nitrating compounds being produced from the various ammonia products derived from the very same ovens. This would be a much more practical arrangement than

A COMPARISON OF COKE OVEN OPERATING FIGURES—Table II.

Plant Number	Charge Dried, Tons	Coking Time, Hours	COAL: High Volatile, Per Cent	COAL: High Volatile	COAL: Low Volatile, Per Cent	COAL: Low Volatile	GAS: Made Per Ton of Coal, Cu. Ft.				B. t. u. Gross, Saved Per Cent	GAS: Sta., as Made			GAS: Sta., Scrubbed			Candle Power	No. B. t. u. Per Cu. Ft.	Use of Gas or Surplus Gas	GAS: Per Cent of Different Gases in Mixture, When Coke Oven Gas Is Used With Coal-gas Water Gas			GAS: Other Gas Making Apparatus Available, Per Cent Its Capacity Is Per Cent of Coke Oven Capacity		COKE: Cost Per Ton of Coke Produced	COKE: Ash in Coke, Per Cent	COKE: Coke Classified, %				TAR: Produced Per Ton of Coal, Gals.	AMMONIA: Produced Per Ton of Coal, Lbs. Sulphate or Equiv. in Liquor	LIGHT OIL: Produced Per Ton of Coal, Gals.	LIGHT OIL: Benzol Per Cent by Vol.	REMARKS
			Per Cent	Kind	Per Cent	Kind	Min.	Max.	Ideal	Used		Min.	Max.	Unscrubbed	Min.	Max.	Unscrubbed				Coke Oven Gas	Coal Gas	Water Gas	Coal Gas	Water Gas				Blast Furnace	Foundry	Stove Gas	Domestic					
I	13.35	18.00	65	West Va. 55, Ky. 12, Illinois	35	Penn	5000	6555	....	11,100	....	504	....	....	500	474	....	....	1300	Gas Co.	75	....	25	10	150	70	5	50	30	10	20	5.38	15	2.07	....	....
II	13.35	17.55	72		28	Penn	5500	5700	....	11,200	....	500	474	....	....	....	....	....	1370	Gas Co.	24	50	15	147	338	72	3	25	20	20	25	....	....	2.2	....	Rich gas only partly scrubbed.
III	7.5	20.5	24	....	76	....	4000	....	....	....	Yes	....	....	....	....	....	....	....	....	Gas Co.	....	....	Depends on amount	....	200	72	....	100	....	....	....	....	....	....	....	....
IV	9.50	13.05	71	West Va., Ky.	29	Penn	....	....	....	10,200	....	535	....	....	500	524	....	....	1000	Gas Co.	....	....	....	....	60	74.04	6.9	40	35	....	22	6.50	20.9	2.93	.36	Coal gas used to maintain city supply, water gas on peaks.
V	21.6	....	20-55	West-moreland	80-10	Penn	....	....	....	10,000	Yes	....	....	....	....	....	....	....	1100	Gas Co.	60	....	40	....	75	....	....	....	....	....	....	....	23	....	....	Plant only recently started up; results incomplete.
VI	17.7	16	90	Indiana	10	Penn	3000	3600	....	9,000	....	525	525	....	500	500	....	....	1400	Gas Co.	....	....	....	100	100	65	12	....	....	....	100	7.5	23	3.5	....	10% ammonia liquor made, 5% lbs. NH_3 per ton of coal.
VII	13.5	15	80	Pittsburgh	20	Central Pa.	....	....	....	....	....	520	490	....	500	460	....	19 Flat Fl.	(1225) (1350)	Gas Co.	....	....	Varying Proportions	....	75	71	4	20	15	40	25	10	25.5	3.5-4.0	3-4 per M	....
XI	13.5	17.33	70	Pittsburgh	30	Penn	....	....	50%	10,440	....	....	....	....	....	....	....	....	1000	Steel Mill	....	....	....	....	....	74.5	5.1	60.6	....	....	0.17	5.16	30.9	2.79	....	Average figures for year 1918.
XII	11.85	15.45	75	Youghiogheny 67 Elkhorn Ky. 33 and Illinois Monongahela	25	Penn	....	....	60%	10,000	....	....	....	....	....	....	....	....	1150	Steel Mill	....	....	....	....	....	75	5.83	60.4	....	....	3.94	9.30	34.28	2.51	....	Average for May, 1918, dry basis.
XIII	10.5	17.37	45		55	Penn	....	....	....	12,000	....	....	....	500	....	....	400	....	1300	Steel Mill	....	....	....	....	....	72	5.5	100	....	....	....	5.70	19	2.5	....	....
XIV	15.4	19	100		0		....	....	....	9000	....	....	....	600	....	....	570	....	1500	Steel Mill Boilers	....	....	....	....	....	62	7	95	....	....	5	13.00	25	2.66	....	....
XV	13.38	18	83	Pittsburgh	17	Penn	5863	....	....	9900	....	....	....	....	....	....	....	....	1170	Steel Mill	....	....	....	....	....	73.33	2.54	97.5	....	....	....	10.44	30.32	3.09	....	....

the erection of Government nitrate plants, which, if operated in peace times, can do nothing but enter into very destructive competition with the very organizations whose help they so badly need in times of war.

Why By-Product Plants Are Erected

A by-product coke plant is usually erected for one of two main reasons: to supply coke to some particular set of blast furnaces, or to supply gas to some town or group of towns, wholly or in part, or to furnish both of these services. In the former case, coke is the main product and the by-products, including the gas, are disposed of with a view to producing the coke at the lowest possible cost. Under these circumstances the gas is usually consumed in the adjacent steel mill in open hearths, soaking pits, under boilers or other heating furnaces. Particular attention is paid to all of the items which go to make up the correct quality of coke for the conditions under which the furnaces are operating, and the coking time, structure and hardness of the coke, along with its analysis, are watched very carefully.

When the gas supply is the main object, this situation is more or less reversed and the quality and quantity of the surplus gas obtainable becomes the principal object in the undertaking. The coke is then disposed of to foundries, blast furnaces, water gas plants, and the domestic trade, but practically as careful a watch is kept on its various characteristics as when the total supply is consumed by any particular set of furnaces. In this case, of course, the low cost of the gas in the holder is the object sought and the plant is run with this end in view. In some cases, by-product plants that are erected as part of a steel company organization, supply part or all of their surplus gas to a neighboring gas company; the operating company must then pay particular attention to both the coke and gas. In any case the other by-products have a large bearing on the final cost, and every pound of sulphate, gallon of tar, or fraction of a gallon of light oil that is produced, figures materially in the final result.

How They Fit Into the Gas Business

The most interesting of the above three conditions to the gas engineer is the one in which the coke plant is owned and operated by the gas company itself. It is only under these conditions that he can appreciate the full value of the by-product process, for it is possible with such a plant to put gas into the holder at the lowest cost of any process now in general use. Between 40 and 50 per cent of the total coke made can be sold as foundry coke, or about 90 per cent as blast furnace coke or any convenient percentage below those given, of the two together. These two grades command a much higher price than the ordinary run of domestic coke, and this increase, together with the operating economics made possible in handling the large volumes of material at a low unit cost, can bring the cost of gas in the holder to an extremely low figure.

Too much emphasis, however, can not be placed upon maintaining the coke market, for, while it is possible to make gas cheaper with the by-product process, when the coke and other by-products are moving, it is also possible to run this cost up to a prohibitive figure if these products, especially the coke, are not sold to advantage, and more money can be lost under such circumstances than in any other of the gas making processes. During the war no plant had any trouble in disposing of practically its entire output as foundry and blast furnace coke. Any that was left over was eagerly grabbed up by domestic consumers. At the time of writing we are going through exactly the reverse condition. The foundries and blast furnaces are absorbing very little coke, and the domestic consumer seems to have forgotten that cold weather will ever again come around. It is under these circumstances that the process is sorely tried, as a large coke pile must be accumulated and the cost of handling the material, even when it is finally disposed of, is considerably increased.

The by-product oven that has the facilities for being heated by producer gas or blue water gas has, in circumstances like these, a large advantage over the straight coke oven as, in the former case, the full gas capacity of the coal is realized, against approximately one-half in the latter. The financial outlay for producers, however, is a heavy one, and generating blue water gas to heat the ovens is about as expensive as making carbureted water gas to replace the gas capacity consumed in heating the ovens themselves. These are problems to be solved by each individual company.

Some may figure that with a more or less restricted coke market the auxiliary gas producer is almost a necessity. In this case, if the coke market should, at any time, expand or improve, the producers may be shut down, and the ovens heated with approximately half of their own gas, with carbureted water gas taking care of the balance of the send out. With a large and more diversified coke market, it may be better to run the ovens continuously as a coke plant, thus getting the benefit of the large coke yield most of the time, and in dull seasons, increase the coking time or lay off some ovens and make water gas while the coke market is poor. No general rule can be laid down to cover these various conditions and each organization must work the arrangement out for itself.

At all events the gas company which distributes gas supplied from a by-product plant, whether it owns the plant or not, should make provision for an adequate reserve capacity. In nearly every case, coke oven gas so supplied is only a part of the total gas distributed, and coal gas and water gas go to make up the difference. Under such circumstances the gas company is likely to have sufficient water gas reserve to take care of the volume of coke oven gas should this supply for any reason cease, or be reduced.

The quality of the gas furnished by a by-product plant may or may not meet the requirements under which the gas company must distribute its product. Ordinarily, by-product ovens should have no difficulty in furnishing 575 to 600 B.t.u. gas, and in places where a higher B.t.u. is required, or a higher candle-power (this gas usually tests about 13 with a flat flame), the difference in quality is made up with carbureted water gas.

A Comparison of Operating Results

Some of these points, together with other information, are shown very clearly in the following table which was made up from the answers given in a questionnaire sent to 35 coke oven operators throughout the United States. The plants supplying gas for domestic consumption are given in the first group, while those whose gas is consumed in a neighboring steel mill, are given in the second. I regret very much that all of the companies requested did not send in their replies; surely nothing is to be lost by giving out such information, and the comparison of results together with their discussion helps everyone. It should be noted that in every case considerable water gas capacity is owned by the gas company and in some cases, coal gas capacity, so that in no case is this reserve under 75 per cent of the surplus gas capacity of the ovens.

Operating a By-Product Plant as the Main Gas Supply of a Large Company

When a by-product plant is operated in connection with a steel mill, the main product is coke and the gas is considered more or less as a carrier of the various by-products. When these by-products are extracted, the gas is used about the mill, and the ovens are credited only with the amount of coal that it replaces. Under these circumstances very little attention is paid to the quality of the gas, the critical point in one plant being merely its nitrogen content. When this gets to be above 20 per cent there is trouble in handling the increased volume, and more attention is then paid at the ovens to excluding air and products of combustion. On Sundays and holidays, or when the mill is not using all of the gas, it burns from a nearby bleeder pipe. When the gas is being sold for domestic consumption, however, the quality must be carefully watched and all doors, plugs, spooning holes, etc., about the ovens and by-product building must be tightly closed to exclude all air, and the pressure in the ovens must be kept at zero or above to exclude the products of combustion which might be sucked through cracks in the brickwork.

Coal is usually received in cars, or by barge, and unloaded directly into a track hopper or placed in storage piles by a bridge or crane. A mixture of high volatile and low volatile coal combines the superior coking qualities of the latter with the large gas yield of the former, and produces a maximum amount of rich gas, and at the same time a good metallurgical coke. Special pains should be taken to see that the high and low volatile coals do not come in contact in any way while in storage as such a mixture lends itself very easily to spontaneous combustion. These coals are run up separately from the track hopper to a Bradford breaker, a large rotary screen with lifting plates which elevate the coal as they revolve, dropping it onto the screen plates below. The coal breaks up and passes through the holes about 1¼ in. square; any bone, slate, splint, stone or wood which does not break passes from the end of the screen into a rejection bin.

From the breaker the coal is fed directly to a hammer mill. This machine contains steel plates or hammers which revolve at a high rate of speed and finely pulverize the coal, grinding it so that 75 to 80 per cent, or more, will pass through a ⅛ in. sieve. Each coal is then fed separately into one of two mixing tanks from which it is drawn out by two steel belts or apron conveyors running at the same speed. The two conveyors run towards each other and discharge on opposite sides into a hopper. By regulating the gate at the bottom of each mixing bin any given percentage of each kind of coal can be put into the final mixture. As the coal falls into the hopper, revolving paddles agitate it and mix it thoroughly, this mixed coal being elevated by another belt conveyor to the storage bin over the ovens.

From the storage bin the coal is delivered to a motor driven larry car which holds a full charge for one oven. The lids to the oven are removed, the car is run over that particular oven, and the coal emptied into it. A long arm on the pusher levels off the top of the coal and thus makes a passage for the gas to travel toward the collecting main end of the oven. After the coal has remained in the ovens a certain specified time, usually 15 to 24 hours, depending upon the size of the oven, the demand for coke, etc., the doors are removed and the coke is pushed into a quenching car. A modern quenching station consists of an elevated tank of a capacity of 10,000 to 15,000 gallons placed at one side of the hot run track, with two cast iron perforated pipes extending over the track, parallel to the rails. The hot car, either self-propelling or drawn by a steam or electric locomotive, is brought under the pipes, and 45 to 60 seconds, with a head of 45 ft., puts enough water on the coke to properly quench it. A large brick or concrete stack carries the resulting steam up in the air away from the rest of the plant. After draining for a minute or two, the car is run to the wharf where the coke is dumped and has an opportunity to dry and cool.

It is important to see that just enough water is put

on the coke so that the heat remaining in the interior of the pieces is about sufficient to evaporate most of the water clinging to the outside surface, and coke properly quenched should not have over 3 per cent moisture in the run of oven or furnace size, or over 1 per cent in the foundry. After resting on the wharf for a short period, the coke is fed on to a belt conveyor and carried to the screening station where foundry, blast furnace, water gas, or domestic coke is made, according to the demand.

The gas that comes from the coal is collected in one of two collecting mains which run along the top of the ovens, on one side. The gas coming off the first part of the charge is much richer in illuminants and other hydro-carbons than that of the latter part, and is collected in what is known as the "rich" main. After the charge has been in the oven a certain specified time (about one-half of the coking period), dampers or valves in the off-take pipes are changed so that the gas is then delivered into the "lean" main. At the head of each main on each battery of ovens is a governor which operates a butterfly valve in the foul main at the point where it leaves the ovens. By means of this governor the pressure is kept constant in the main—two to five millimeters of water pressure in the rich main and usually one to two millimeters lower in the lean main. In this way fluctuations in pressure caused by the exhausters do not get back into the ovens.

The rich and lean mains then cross over to the by-product building where the gas is cooled before it enters the exhausters. Considerable light tar and ammonia liquor condense in the coolers and mains, and this is led into a circulating tank from the bottom of which a pump supplies some of the mixture to the end of each collecting main, through which a current is kept flowing to absorb and carry along any pitch and heavy tar condensing at these points. All of the flushing tar and liquor is returned to the flushing tank, and the surplus over that required by the collecting mains is pumped into the separation tank where the tar and liquor separate, and are syphoned into different storage tanks. The liquor so collected contains about 10 or 12 grains per liter of NH_3.

This liquor is run through a still from which the free ammonia is driven off by steam, it being then mixed with milk of lime and passing through another section of the still where the fixed ammonia is freed, and joins that coming off the free section. This ammonia vapor is then returned to the gas and later extracted in the saturators.

The speed of the exhausters is regulated by Hontoon governors, usually arranged so that a constant suction is kept on the gas mains at the inlet to the coolers. A suction of one to two inches of water at this point should be sufficient to take the gas away from the ovens, and give a slight suction on the exhauster side of the butterfly valve of the collecting main governor. From the exhausters, the gas passes through tar extractors where the last traces of tar fog are removed, and from thence through re-heaters where its temperature is raised by exhaust steam to about 150 to 160 deg. Fahr., before it enters the saturators. The saturators are large lead-lined vats, cone shaped on the bottom, which contain a 5 per cent solution of sulphuric acid. This acid combines with the ammonia in the gas to form ammonium sulphate, and when the solution becomes saturated, the sulphate falls to the bottom and is removed by an air lift to a draining table. The surplus liquor is drained off and the salt is fed to centrifugal driers where it is washed with a little hot water and ammonia liquor to remove the last traces of acid, and is dried by centrifugal force until its moisture content is reduced to about 1.5 per cent. It is then removed to the adjacent storage pile, from which it is bagged for shipment or loaded in bulk, as the various orders specify.

From the saturators the gas is conducted to the light oil plant where it first goes through coolers which reduces its temperature to about 60 to 80 deg. Fahr., depending upon the temperature of the available cooling water. Then it goes through the scrubbers where it is brought into intimate contact with a high boiling petroleum oil which absorbs or scrubs out the so-called light oil. Both the coolers and the scrubbers are filled with wooden trays and the water and oil respectively are sprayed or splashed in from the top. The large surface exposed to the gas by the trays, over which the oil trickles toward the bottom, insures a very intimate contact and an efficient removal of the light oil. From the scrubbers the rich gas goes to the purifiers, through the meters, and into the storage holder, while the lean gas flows to the lean or fuel gas holder from which it is drawn as needed and consumed in heating the ovens.

The wash oil, after its contact with the gas, is pumped to the wash oil still, passing on its way through an oil-to-oil heat exchanger which transfers some of the heat from the outcoming to the incoming oil. From there it goes through a pre-heater so that it enters the still at a temperature of about 145 deg. Fahr. The light oils are distilled off and the wash oil from the still passes through the oil-to-oil heat exchanger, and then through coolers to the service tank, from which it is pumped for re-circulation in the scrubbers. The light oil removed in the wash oil or continuous still, condenses and is collected in tanks. This oil is then redistilled and broken up into its various fractions, carbon disulphide, benzol, toluol, xylol, and heavy solvent, with more or less residue of wash oil and naphthalene.

The products of the first distillation are known as 90 per cent products or crude products. When the pure product is made, the 90 per cent benzol, toluol, or xylol, as the case may be, is first washed with sulphuric acid, then with caustic soda to remove all traces of the acid, and finally with water to remove the caustic soda. The acid absorbs various carbonaceous materials still in the 90 per cent product, which are drawn off from the bottom of the washer in a thick tarry liquid. After washing, the crude products are given a final distillation through which a very accurate temperature control must be maintained on the still, and only the distillates coming off between very close temperature ranges and passing other severe tests are accepted as pure products. The rejections from the pure still are run back into the 90 per cent product tank and re-distilled later.

When motor benzol, or motor fuel, as it is sometimes called, is made, this process is varied somewhat. About 5 or 6 per cent of the first runnings of the light oil distillation, containing nearly all of the CS_2 is first drawn off, as a sulphur content of over .15 to .20 per cent in the final product is usually objectionable. The balance of the light oil, with the exception of the heavy solvents, is then distilled into the crude products tank, washed as described above, and re-distilled. Specifications usually call for 90 per cent of the final product to distill off at 100 deg. C.

When the rich gas has been scrubbed in the manner described, its heating value is reduced from 5 to 7 per

cent, and it is sometimes necessary to enrich it in order to make it pass the necessary local requirements as to heating value. This is done by vaporizing crude benzol and passing the resulting vapor into the gas at some point beyond the scrubbers, usually just before the meters. Another method is to only partially scrub the rich gas, bringing it into contact with wash oil more or less saturated with benzol previously absorbed, so that only the higher boiling fractions, toluol, xylol, etc., are removed, and more of the benzol remains in the gas. Some plants do not attempt to scrub the rich gas at all, obtaining only the light oil products removed from the lean. Local requirements, now that the war is over, are, of course, the governing factors in this part of the process and no definite rule can be laid down as to how this should be carried out.

Conclusion

What is the future of by-product gas in its relation to the gas industry? There are several ways along which this may work itself out. The replacement of natural gas already mentioned is one and should this be carried out, the coke produced will replace a lot of beehive coke now manufactured, and will also find a large domestic market. In this case it is also very probable that the coke plants will be owned and operated by the existing natural gas companies, and the coke supplied to blast furnaces which have not their own coke plants.

Should it develop that the steel industry brings about, more or less, the elimination of beehive coke by the erection of by-product plants in close proximity to their furnaces or groups of furnaces, it is very probable that more gas will be produced than can be used in the various steel mills interested. Under these circumstances, part of the surplus gas will probably be distributed by the various local gas companies situated in the surrounding towns. Should this not appear feasible, it is possible that some of the extra gas may be used in the generation of electric power. This is one branch of the by-product business in which we have lagged behind European practice. We have but one large gas engine installation in this country, at Lebanon, Pa., using by-product gas to generate electric power.

A third solution of the problem is the supplying of a group of small towns and cities within a fairly well populated area by a centrally located plant such as the one at Camden, N. J., or Joliet, Ill. In both of these cases the various towns supplied had all outgrown their own small gas making capacity and a happy consolidation was the means of bringing about the erection of the centrally located plant and the subsequent high pressure distribution of its gas.

Sees Nothing Intricate to the Labor Problem—Freak Remedies Will Not Solve It, But Putting Into Practice Certain Fundamental Principles We Are All Acquainted With

(*Continued from page* 350.)

"Q. Do you apprehend much opposition.

"A. Not from **sensible** and **enlightened** persons; but I am fully prepared to meet and refute all **obstinacy, prejudice, ignorance** and **malice.**"

While we could not afford to follow him in many particulars, in this conclusion we should be with him heart and soul. And it will be in proportion to the earnestness with which we are "prepared to meet and refute all obstinacy, prejudice, ignorance and malice" that we shall succeed in placing the gas industry of to-day in its proper relation to the commercial and industrial life of our people.

Some may think that we take the work of the association very seriously. We do. We would be unfitted to hold office as your representative if we did not. But seriously as we feel the responsibilities you have put upon us, few of us realize what the value of the association would be to the industry and to the country if it should actually accomplish the purposes of its founders. These purposes can be accomplished, our ideal can be achieved, but only by standing shoulder to shoulder, only by hard work and genuine co-operation, each member doing his share, "pulling his weight in the boat," as the phrase goes. The industry must as never before impress itself upon each community, and each company must feel its individual responsibility in that regard. It is as true to-day as it ever has been that "a house divided against itself cannot stand." The members of the gas industry must co-operate to a common end. They must work tirelessly for the highest efficiency, and for the creation of a just and friendly public opinion.

Let us all give our best efforts to make our industry more and more worthy to hold a commanding position in the business life of America.

Let's go—let's go forward—to our task, our duty, our opportunity, in the land of fair play.

Repair Clamp for Gas Leak on Submarine High Pressure Pipe Line

Diver, Not Being Able to See, Trouble Had to Be Determined by Touch

A leak developed on an 8-in. high pressure gas main which crossed a channel of water. The leak was located 200 ft. from shore in 40 ft. of water.

A diver was used for the purpose of finding the leak and making the repair. It developed to be a split in the pipe at right angle to the length. The diver cannot see in deep water so it could not be determined just what the conditions were. By feeling he found the hole which was hardly large enough to put his little finger in.

Immediate repairs were necessary as the line fed industrial business. Fortunately the accident happened on a holiday when the plants were shut down. The pressure was removed from the line without inconvenience to the consumers.

A split clamp available from equipment found in the shop was used. This is illustrated in Fig. 1, as submitted in a "Wrinkle" at the recent annual convention of the Pacific Coast Gas Association. On the side that covered the leak a strip of lead gasket

(*Continued on page* 378.)

Scope of the Advertising Section of the American Gas Association

Ambitious in Plan, but Not Extravagent — What Will Be Aimed at the First Year

No one will deny there is a lack of appreciation of the gas industry as a whole by the public. Few people, generally speaking, understand the simple methods of the manufacture of gas or the fundamental principles of combustion and fewer still realize that in burning gas they are helping to conserve the natural resources of the country, is the contention of the Plan and Scope Committee of the American Gas Association.

We have failed to provide sufficient facts and material on which the public could base an understanding and appreciation of the gas business, thereby leaving an open door for the evil minded and ulterior purposed. Through proper educational and publicity plans, a wider discussion of these subjects will develop, and out of it ought to come a standardized basis of regulation which should be intelligent and sound, thus providing a continuing policy which would give greater confidence to investors in our securities.

Right Kind of Publicity Can Accomplish More Than Anything Else

There is a great lack of information published in regard to gas and its use. That is one reason why it is not better appreciated. Education is the only cure for this condition. If we could properly get facts and figures of our own business, the value of our service, uses and application of gas forcibly before the people of the country, many of our troubles would be eliminated.

It is believed by those who have promoted and are carrying on the work of the advertising section that the right kind of education and publicity can accomplish more for us in the way of remedying conditions than anything else.

Spread Broadcast the Story of Gas

Your section has made a careful study of the general conditions of the industry and the possibilities which will result from a persistent and continued campaign of education and publicity. It has worked out a plan to be followed and will be pleased to present to you the general program decided upon. This plan is not based upon a theoretical or superficial study of the advantages of advertising, but it is based upon a practical study of similar campaigns that have been carried on by such organizations as the Bell Telephone Company and the Gas Association of Great Britain. These campaigns have been highly successful in those organizations which have followed a consistent policy over a period of years and the advertising section is fortunate in having access to the methods and data of such campaigns.

It is the intention of the advertising section to spread broadcast the story of gas as widely and successfully as the story of coal, of steel and of the telephone.

It is an unfortunate fact that the people know less about the gas industry than they do about any of the other utility industries, or than they do about such industries as coal, steel, sugar, oil or the railroads. There is as much romance in the gas industry as there is in the coal industry. But the story of coal has been told throughout the world, while the story of gas has never been popularly presented in this country. It is even doubtful whether there are many men in the industry itself who can visualize the industry in a way that would appeal to the layman. But our section is confident that this can be done and that it will prove of great value to all concerned.

Burden of Proof Upon Our Own Shoulders

The section is of the opinion that its work will not accomplish the objects for which it was organized unless the fullest co-operation of the members of the association be freely granted. It is naturally assumed that such co-operation will be forthcoming, but particular emphasis is laid upon this matter owing to the fact that the advertising section will come into more frequent contact with the members of the association than any other section. As the plans of the committee develop, one or more of the executives of each gas company will have daily evidence of the existence and activities of the advertising section. Only the most generous co-operation and the closest co-ordination of effort between the members and the section will make the work of the advertising section the success we all wish for it. It is realized by the section that the burden of proof will be upon its own shoulders, and that the degree of co-operation it received from the members will be dependent largely upon the service it performs and the value of that service to the members. The section has made its plans with this end in view and it predicts that the service it will offer the members of the association will be the greatest incentive to the co-operation and co-ordination that is so necessary to its success.

What the Plan Includes

The section's plan includes a general publicity and advertising service for individual companies and a publicity campaign for the gas industry as a whole. It is extensive in one sense, but it does not call for a large expenditure of money. Following our President's suggestion along these lines, the section has limited its program to a few essentials which it plans to accomplish thoroughly rather than endeavoring to enter upon an extensive advertising campaign that would require a large working force and an enormous expenditure of money.

The section will be a clearing house for advertising and publicity copy issued by the companies belonging to the association. Each company will be asked to send to the section at regular intervals, clippings from local newspapers of advertisements by the gas company, news items about the company and about the industry and publicity matter sent out to the newspapers. Too much emphasis cannot be laid upon the importance of sending in such clippings regularly, for not only will it supply the section with valuable ideas that may be disseminated among other companies, but it will also give the section valuable data regarding the trend of public

opinion. To conduct a successful publicity campaign, it is necessary to watch constantly the public pulse, and no better criterion of public opinion exists than the news pages of the daily papers.

Articles on the Gas Industry

The section plans to prepare articles on the gas industry for the *A. G. A. Monthly*, the technical and trade papers, the national magazines and the newspapers. Popular stories about the industry will be written to the national magazines and also syndicated in the newspapers of the United States and Canada. News items will be prepared for the newspapers and sent to the company members to be submitted to local papers. The section will not attempt to send such items to these papers direct as it realizes that one of the most important factors in the development of cordial relations between the company and the newspapers is the personal contact of the utility manager and the newspaper man. It is important, in fact, that each company should give the papers the fullest information possible upon matters relating to the company, and that it should constantly endeavor to create the impression that the company has no other story to tell than the truth, that it is proud of that story, and that it is willing to shout it from the house tops. This is not theory. It is a practical policy that has been followed successfully for years by some of the largest corporations in the country, notably the Pennsylvania Railroad and the American Telephone & Telegraph Company, and it is offered at this time as a suggestion that will be of material assistance in the campaign that is about to be inaugurated.

The magazine and syndicated newspaper articles will be along educational and instructive lines. Their purpose will be the dissemination of the real value, usefulness and importance of the gas industry. The news items will be what their name implies—NEWS.

The section will be at the service of the members in extending to them such assistance as may be required in criticising or preparing advertisements, folders, publicity, etc., for special purposes.

An advertising service will be one of the principal functions of the committee. Advertisements will be prepared by expert copy writers and set up with proper attention to typography which will be submitted to the various companies. Special merchandising campaigns will be planned.

Will Not Interfere with Present Programs

This plan will not in any way interfere with present advertising programs of the members of the association, neither will it call for a larger expenditure of money for advertising on the part of the members. It merely means that each company will use a portion of its space for educational advertising. The plan gives the members of the association the benefits of a national advertising campaign; it will help to tell the story of the local company to the people in its territory; it will create favorable public opinion towards the local company as well as the gas industry, and it does not involve the expense usually attendant upon a national advertising campaign.

The section is anxious to obtain suggestions and criticisms of this plan and will be glad to entertain ideas for the extension of its activities. The section has already considered many plans that have been suggested, including an advertising campaign in the national magazines, but it is the policy of the section and the association will doubtless concur in it, that the plan as outlined herein is as extensive as it is advisable to start with.

For the First Year

In conclusion, we may summarize the plan by saying that it is proposed during the first year to do three specific things. First, to publish through the advertising space of the gas companies in their local papers, educational information of a broad fundamental character in regard to the gas industry of a nature which all gas companies can subscribe to. Among these are, the conservation of natural resources through the carbonizing of coal, the fundamental principles of combustion and the application of these to gas, the great amount of capital invested in the industry, the importance of the service gas companies render to their users, the superior value of gas as fuel, gas compared to coal, the importance of piping new buildings for gas, etc.

Second, the preparation of articles for publication in the popular, technical and trade press to promote public interest and create good-will and also make a bigger market for gas.

Third, to give advertising assistance to the various companies through the preparation of folders, literature and advertising copy.

Repair Clamp for Gas Leak on Submarine High Pressure Pipe Line

(*Continued from page 376.*)

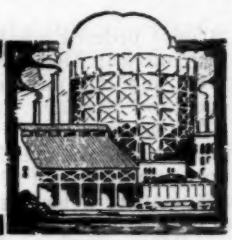
was laid with a strip of lead wood along the edges. The whole was then filled with red lead and white lead putty. This was then taken to its place by the driver and put on with little difficulty. When the gas was turned on and 40 pounds put on the line, there was no leak. The job was done in one day and gas service was available when the industries started up on the following morning.

As the repairs were considered temporary it was decided to reinforce the clamp by a long split sleeve. It was feared that the line was possibly under a tension strain at this point which would have a tendency to open the break. The sleeve illustrated in Fig. 2 was made from a piece of 12-in. casing. With the aid of the welding torch, just the shape desired was constructed. Making it from wrought iron made it convenient to handle, for a heavy casting could not be handled so easily by the lone driver.

It was necessary and desired to leave the clamp in place, so the periscope effects on the sleeve were conceived of to take care of the extensions of the clamp. The bottom branch was capped, the top reduced to 6 in. by welding on socket. When the sleeve was placed it was yarned at the ends with lead wool and hemp. Then through the top cement grout was poured. The cement was well mixed on board the diver tender and placed in sacks. The diver experienced no difficulty in putting the cement in place. His only complaint was that it could have been wetter. After puddling the grout to make sure that it filled the sleeve, the top 6 in. plug was screwed in place and the lead wool once more caulked.

The line is now in service and the joint highly satisfactory.

NEWS OF THE GAS INDUSTRY



New Contracts in Chicago District Reveal Varied Uses for Gas Daily

Another victory for gas as fuel is the installation at the plant of the National Malleable Casting Company in Chicago. The decision to use gas came after a series of exhaustive tests comparing coke and gas, and resulted in a contract for sixteen coke ovens. The monthly consumption of gas will amount to 2,000,000 ft.

Other contracts which reveal the varied uses to which gas is being put in the Chicago district are those with the Continental Horseshoe Company for gas in a reverberatory furnace for treating steel, which will burn 600,000 ft. of g monthly; one with the Standard Spring Company for a complete gas equipment for their hardening room, and another with the Armstrong Paint & Varnish Company for fires in their new plant.

$1.75 Rate and $1.00 Minimum Effective in Huntington, L. I.

The Long Island Lighting Company, successors of the Huntington (L. I.) Gas Company, has given its customers notice that on Nov. 1 it will raise the rate from $1.50 per 1,000 cu. ft. to $1.75, and in addition will place a monthly minimum charge of $1 on each meter. The officials give the high costs of coal, labor and supplies as the reason for the present advance, claiming that at the present time there is a shortage of nearly a million tons of hard coal at the mines as compared with last year, and predict that conditions cannot change for some time.

"This company carried on its gas operations for the first seven months of this year (1919) at a loss of more than $13,000," says the statement. "If the same percentage of loss prevails for the balance of the year, the loss will be nearly $24,000. This loss is on operating expenses alone and does not allow anything for the stockholders on the money invested."

St. Louis, Mo., Chamber of Commerce to Conduct School for Safety Engineers

The St. Louis Chamber of Commerce, under direction of the National Safety Council, announces the opening, in October, of the School for Safety Engineers. Philip Stremmel, general superintendent of the National Stamping and Enameling Company of St. Louis and Granite City, Ill., has been appointed to serve as director of the 1919 winter term of the School for Safety Engineers. The National Safety Council conducts similar schools for engineers at Pittsburgh, Pa., Cleveland, O., and Rochester, N. Y. The 1919 winter term will cover twenty subjects relating to industrial safety and engineering among which will be the following: Safety and the Manager, Safeguards, Plant Lighting, Reaching the Foreman, Bulletin Boards, Workmen's Inspection Committees, Head and Eye Protection, Plant Sanitation, Layout of Plant Buildings and Machinery, Fire Protection, in Relation to Industrial Safety, Electrical Hazards in Industrial Plants, the New Employee, Foreign Born Americans and the Qualifications of a Safety Engineer.

Brooklyn Union Gas May Charge Over 90 Cent Rate

The Appellate Division in Brooklyn modified a decision of Supreme Court Justice Benedict which enjoined the Brooklyn Borough Gas Company from charging more than 95 cents per 1,000 cu. ft. for gas. The modification means that the injunction was good only until Sept. 8, 1918. The company may collect for gas since that date at a figure higher than the 95-cent rate, the decision just made being retroactive. No legal rate is fixed under the Appellate Court ruling. It may be any rate which the Public Service Commission fixes as reasonable.

Distributing Companies Will Try Doherty 3-Part Rate Plan

The towns and distributing companies on lines of the Wichita Natural Gas Company have expressed their willingness to try the Doherty 3-part rate plan as a basis of charging for natural gas. As soon as the preliminary details can be worked out, the plan will be put into effect. At a hearing in Topeka, Kan., at which representatives of the Empire Companies voluntarily appeared and offered testimony as to the practicability of the plan, the Kansas Public Utilities Commission, before whom the hearing was held, agreed to allow the plan to be tested.

Central Power Company Raises Standard to 570 B t.u.

The Central Maine Power Company is endeavoring to improve the quality of the gas which it is serving the City of Bath, Me., public according to a letter from George S. Williams, general superintendent, to Lucian D. Fuller, secretary of the Chamber of Commerce of Bath, Me.

At the hearing last month upon the petition of the company to increase its rate for gas much evidence was brought out to show that the quality of the gas was not up to the standard which patrons of the company believed that they should receive. Representatives of the company stated that they would endeavor to bring this gas up to the point which would make it satisfactory. That they are doing this is shown in Mr. Williams' letter which says:

"Dear Sir.—At the hearing held in Bath in regard to increase in gas rates, the question of the quality of the gas furnished was brought out very strongly by the Chamber of Commerce representative, and the company stated at that time that they had been told the gas was of 570 B.t.u. standard.

"After listening to this criticism we

at once ordered a calorimeter from the American Meter Company by express and this machine was put in operation Monday, August 18th.

"Upon making tests upon the compressed gas, when ready for distribution, we find it is of 569 B.t.u.'s. We are planning on increasing the quality of the gas slightly so as to bring these tests above 570.

"This test was made upon the same quality of gas as has been furnished since the gas plant was put in operation, using the same number of pounds of coal and gallons of oil per thousand cubic feet of gas manufactured.

"I know that you were much interested in this argument—therefore, the reason for forwarding this information."

Long Island Company's Rates Up November 1

The Long Island Lighting Company, of New York, has filed with the Public Service Commission, Second District, a tariff changing its rates for gas in Amityville, Babylon, Brightwaters and Farmingdale, and the towns of Babylon, Huntington, Islip and Oyster Bay, Long Island, proposed as effective on Nov. 1. Combined block and step meter rates for light, heat and power, available to all consumers, are to be increased 25 cents per 1,000 cu. ft. for monthly consumption less than 1,000,000 cu. ft., and 20 cents for 1,000,000 cu. ft. or more. A minimum charge of $1 a month is to be established.

Error of $124,872 in City Tax Assessment

A clerical error amounting to $124,872 in the Miami (Fla.) Gas Company's assessment on improvements was made by the city tax assessor.

The company's attorney pointed out that the assessment of one-quarter on the improvements should be $141,610 instead of $161,690, a difference of $19,980, or $566,440 instead of $691,312.32 on the full valuation from which the 25 per cent was based. City Tax Assessor G. Duncan Brossier readily admitted that this was a clerical error and the change was made in the books.

The personal assessment against the company was reduced from $20,000 to $4,200 on the objection of Attorney Shutts that it was not on the same basis as that assessed against other utility companies.

Natural Gas Company Files Dissolution

Notice of the voluntary dissolution of the Northern Montana Natural Gas Company has been filed in the office of the Secretary of State of Montana by C. F. Kelly, John Gillie, L. O. Evans and F. M. Kerr, of Butte, who constitute a majority of the board of directors. The company has no assets, according to its report, and has no intention of ever resuming operations.

City Makes Overtures to Peoples Company to End Quarrels

Overtures of peace have been made by the city of Chicago to the People's Gas Light & Coke Company after years of quarrels and bickering.

The proposal, which purposes to attain the establishment of a proper set of rates for consumers, was made to the council committee on gas litigation by Special Counsel Donald R. Richberg. It was accepted and Chairman Capitain forthwith wrote to the company heads for an early appointment.

Two reasons for the proposed scheme were given by the attorney, which briefly follow:

The lawsuits have been a source of expense to both the city and the company, while the consumers have been compelled to pay the costs.

Co-operation between the two parties concerned will not only end these expenses, but will bring about a permanent set of rates justly based on the company's real valuation.

The Circuit Court, which is hearing the city's alleged claim for $10,000,000 alleged overcharges resulting from the 1911 ordinance, and the State Public Utilities Commission, which has charge of rate matters, will be asked to co-operate. The hearing commenced Monday, Sept. 22.

The company will be asked to agree to have its valuation books to be used in the commission's investigation, also used in the $10,000,000 suit, since much of the testimony in the latter suit will involve values the company will set up before the commission. The city, in turn, will be asked to agree to the same action in regard to its valuation estimates.

Speakers of International Reputation Took Part in Steel Treaters Banquet

New Officers Elected

The first banquet of the society, held Sept. 25 at the Morrison Hotel, set a high standard. Speakers of international reputation who were present included John W. O'Leary, counselor of the United States Chamber of Commerce; Dr. Henry Marion Howe, LL.D., Sc.D., dean of American metallurgists, and Joseph W. Richards, A.C., Ph.D., professor of metallurgy at Lehigh University. The addresses were followed by a vaudeville entertainment.

On Friday the members visited manufacturing plants in the Chicago district, and in the evening attended an informal reception and dance. Saturday was "Chicago Day," when the doors of the armory were thrown open to local manufacturers and their employees. The Third Regiment Military Band gave concerts during the afternoon and evening.

During the week some of the members found time to attend the meetings of the various other technical societies convening in the city, particularly the sessions of the American Institute of Mining and Metallurgical Engineers, and to visit the giant Chemical Exposition at the Coliseum and the First Regiment Armory.

Following are the officers of the society: President, T. E. Barker, production engineer, Miehle Printing Press & Manufacturing Company, Chicago; first vice-president, A. F. Boissoneau, William Ganschow Company, Chicago; second vice-president, E. J. Janitzky, metallurgical engineer, Illinois Steel Company, South Chicago, Ill.; secretary-treasurer, A. G. Henry, metallurgist, Illinois Tool Works, Chicago.

Albany Company Making Improvements

The Municipal Gas Company, of Albany, N. Y., is making extensive improvements to its plant in North Albany. The large tank at the foot of Mohawk Street is being repainted and the small tank and the buildings will be repainted.

Freight Rates on Coke Changed

Freight rates on coke shipped to the Peoples Gas Light & Coke Company from points west of the Mississippi, including St. Louis, have been changed by a ruling of the Chicago Western District Freight Traffic Committee. The shipments involved were those to the South Chicago plant of the Peoples company on the Pennsylvania Railroad. Formerly the Wabash Railway absorbed but $5 of the Pennsylvania Railway switching charge, but by the ruling the Chicago rate will now apply to this industry. The petitioner in the case was the Wabash Railway, and the hearings were held before F. P. Eyman, chairman of the Chicago Western District Freight Traffic Committee. The argument which was presented by the Wabash representatives was to make the same rate as is in effect on the Chicago & Alton Railway.

Gas Company Awarded $33,582 Against State—Appeals for More

Appeal from a claim award of $33,582 given the People's Gas & Electric Company, of Oswego, against the State of New York has been taken by the plaintiffs in the action. The gas company declared that the State of New York prohibited it from drawing water from a hydraulic canal at Oswego, and as a result it destroyed the water power, the land and the power station at Oswego. It asked the State for $176,696.01 damages, but only collected $33,582. The appeal was to be argued in the Appellate Division.

West Virginia Asks Dismissal of Injunction Against Restriction

Dismissal of injunction proceedings brought by Ohio and Pennsylvania to enjoin enforcement of a West Virginia law restricting the sending of natural gas into adjoining States was asked in motions filed in the Supreme Court by Attorney General England, of West Virginia. He insisted that the legislation was constitutional and charged that a monopoly of natural gas produced in that State was held by seven gas companies, which transported 76 per cent of it to other States.

Plans for March Meeting of Illinois Gas Association

Establishment of Research Bureaus and Expansion of Laboratories Will Be Big Topic

Preparations are already under way for the annual meeting of the Illinois Gas Association, which will be held in Chicago during March, 1920. The committee in charge is preparing a list of papers to be presented, and expects to have the list complete after the meeting in New York of the American Gas Association, Oct. 13 to 18. A manufacturers' exhibit will be held in connection with the convention, thus continuing a policy which met with much approval in the 1919 convention.

One of the big points to be discussed is the question of the establishment of research bureaus in connection with gas companies not now supplied with them and expansion of the laboratories now in existence. It hardly needed the stimulus of the American Chemical Exposition and the conventions of the American Steel Treaters' Association and the American Institute of Mining and Metallurgical Engineers, which were in Chicago the week of Sept. 22, to bring home to the gas industry of Illinois the importance of research and experiment. The fact that laboratories have often been the means of discovering and remedying wrong manufacturing processes, it is believed, is alone worth the cost of their maintenance.

Co-operation of Plumbers and Dealers Showing Results in Sales of Gas and Water Heaters

Excellent demand for gas heaters is evidenced in the Chicago district this fall, is the report from a prominent gas company. The new types of heaters which have recently come on the market, particularly the radiant-heat type, are proving very popular.

Sales of water heaters continue good, it is also reported. The co-operation of plumbers and dealers in various towns is proving a strong factor in the victory of gas over coal for this purpose.

A drive against the practice of heating water by the use of coils in furnaces will be made by salesmen of the district, it is announced. The waste of heat caused by this method will be demonstrated, and the gas water heater recommended as the economical and convenient method.

Urges Companies to Educate Consumers to Read Their Meters

The "lowly gas meter" is regarded by the average householder as a "cellar vampire," but it is "in reality a faithful servant," F. J. Schafer, an official of the Southern California Gas Company, told the delegates to the Pacific Coast Gas Association convention at its recent meeting.

Schafer urged a campaign by gas companies to educate consumers to read their own meters and "thus obviate heated discussions between customers and companies over the question of whether meter readings are correct."

His discussion of the gas meter came under the topic of "Complaints," the meter being blamed for the largest number of objections and misunderstandings that arise between the companies and their patrons.

"However," asserted Schafer, "the gas companies should always listen to complaints, whether justified or unjustified, and do every reasonable thing to straighten out difficulties."

Next P. C. G. A. Meeting Will Be Held in Portland, Ore.

For the first time in the twenty-six years' existence of the Pacific Coast Gas Association a city outside the State of California has been chosen as a convention meeting place, and Portland, Ore., is accorded the honor. The decision was made unanimously at the annual convention held in Los Angeles, and representing different gas interests in California, Washington and Oregon.

The invitation to meet in Portland was extended by Guy W. Talbot, who was in Los Angeles during the convention. The meeting will be held in September of next year. Northern men elected to membership on the new board of directors are W. M. Kapus, Portland, president of the Northwest Gas & Electric Equipment Company, and D. J. Young, manager of the Tacoma Gas Company.

Personal Notes

ROY N. BUELL, for many years connected with Parker-Russell Mining & Manufacturing Company as an erecting superintendent, has joined the forces of the Russell Engineering Company of St. Louis in a similar capacity.

EDWIN F. RIPLEY, representative of the *Gas Age* in the Chicago territory, is moving his home from Auburndale, Mass., to Chicago.

LOUIS W. GEFFINE, representative of the Welsbach Company in New England, has resigned to start out for himself as manufacturers' agent.

H. MCGREGOR TUCKSBURY, who for the last few years has been one of the New England representatives of the Welsbach Company, has resigned to accept a position as correspondence manager with the Kirkman Soap Company.

CHARLES S. GODDARD, commercial manager of the Taunton Gas Company, of Taunton, Mass., has resigned to accept position as special representative for the Welsbach Company in New England, calling on the gas companies in the interest of the new "Thrift" heater, which was shown for the first time at the A. G. A. convention exhibit.

MR. JASPERSON, who has been commercial manager of the Milwaukee Gas Company, has resigned to accept the editorship of the *Gas Record*.

Construction Notes

Newport News Gas Company Making Extensive Plant Additions and Improvements

The output of gas of the Newport News & Hampton Railway Gas & Electric Company, which supplies Newport News, Hampton, Phoebus and immediate surrounding territory in West Virgina, has increased approximately 100 per cent in the past two years, and is increasing at present at the rate of 15 per cent over the same period of 1918. In order to meet the demand the company is making many additions and improvements at its gas plant. Five contracts, outlined below, for installations have been let.

The United Gas Contracting Company is installing two 8 ft. 6 in. water gas sets complete; two No. 8 Wilbraham green gas exhausters; two Moore steam turbine gas blowers; one U. G. I. tar extractor; one Craig Ridgway direct elevator, and one 3-ton scales with accompanying yard connections. Thomas Gore is the erector.

The Stacey Brothers Gas Construction Company is completing a 100,000 cu. ft. relief holder, and one tar separator, steel construction. Frank Passino is the erector.

The D. McDonald Company is installing one 12-ft. station meter.

The Steere Engineering Company is installing two steel purifiers 21 ft. in diameter by 12 ft. deep with the Steere manifold and reverse flow connections. Harwood & Moss, of Newport News, Va., building contractors, have the contract for the erection of the new buildings. These buildings are the modern fire proof type.

Owing to soil conditions it was found necessary to pile for the foundations of the holder and purifiers.

The entire work was designed, including buildings, by the company's superintendent and engineer, J. Bowdoin Cocke, who is also the engineer in charge of erection. The plant is nearing completion, and will be put into operation on or about Nov. 1 this year, at which time the company will shut down its coal gas benches, and go on a water gas basis entirely for the present.

Gas Machinery Company Installing 9 Ft. Double Superheated Carburetted Water Gas Apparatus in Wilkes-Barre

The Wilkes-Barre Company, of Wilkes-Barre, Pa., has awarded a contract to the Gas Machinery Company of Cleveland, Ohio, for a 9-ft. double superheater, carburetted water gas apparatus complete with auxiliary equipment to be installed in the plant at Wilkes-Barre, Pa.

This new set will be erected alongside of the 9-ft. set which was installed by the Gas Machinery Company several years ago, and will take care of the increased send-out of the Wilkes-Barre Company.

Western States Company Building New High Pressure Feeder System

New System Will Circle City and Will Take Three Years to Build

Work involving a total expenditure of nearly $75,000 in order to maintain a high standard of gas service to meet the growing needs of the city of Stockton, Cal., has been planned by the Western States Gas & Electric Company and an order for the materials placed.

The new improvements call for a high-pressure feeder system which will extend around the city and which will require three years to complete, and a new compressor to be installed at the gas works to increase the gas pressure.

Operations will start at once, according to General Manager Samuel Kahn.

The new feeder will feed into the distribution mains, the first link of which will lead from the gas works to the northwestern part of the city. The system will be of 4-in. steel welded pipe.

As the needs of the city do not demand that the entire system be installed at present, the second link to the northern and eastern parts of the city will not be laid until next year. The third year the loop will be completed around the eastern and southern portions of Stockton.

The new mains will be so routed that as little paved street as possible will have to be disturbed.

Including the installation of the new compressor, the company will expend about $30,000 on the improvements this year.

Pittsburgh Company to Install Texas Plant

E. M. Trent & Co., of Pittsburgh, Pa., has obtained a franchise for installing a gas manufacturing plant and distributing system at Strawn, Tex.

American Gas Association Establishing a Tradition for Attendances Much in Excess of the Expected

(*Continued from page* 344.)

each month. In opposition to this some of the men said that their experience had shown them that a campaign of two weeks is enough. That after two weeks interest lags. Mr. Munroe opposed this, because, he said, only one month out of the year devoted to the concentration of water heaters is not giving the subject the full attention it should have. The feeling was general among the men in attendance that there is a great undeveloped field in the sale of the water heater, and that it is one of the big and important fields for the use of gas. Practically everyone present spoke of the comparatively little attention that is being given to the pushing of the sale of water heaters.

This same feeling prevailed on the part of a few regarding street lighting by gas, but it was not the general opinion, however, as in the case of the hot water heater.

Some of the men spoke of street lighting as a field almost universally neglected by gas companies, admitting that it is a troublesome job, from the standpoint of maintenance, but that the value is so great that it pays.

The subject of gas ranges took up very little time and discussion, it being generally conceded that the gas range is purely a merchandising proposition. As Mr. Munroe expressed it in the short discussion that was devoted to the gas range: "If it's a new home it will have one." Mr. Munroe said this is purely a proposition for the merchant, and that the companies get very few added consumers from the sale of ranges, and that the maximum gas range business consists of replacements. Mr. Munroe further said that water heaters, laundry appliances and space heaters were, in his opinion, the three important means of selling gas that should be pushed. At mention of the incinerator, requests were made by the men regarding a satisfactory incinerator on the market. The fact was brought out and it was agreed to by all present that there is at present no satisfactory incinerator on the market.

Discussion as to how gas companies can make the winter business keep pace with the summer came up. Thomson King, of Baltimore, said he believes that the whole scheme of modern life will tend to force people to continue the use of gas in their places throughout the winter. Thomson King suggested, because of the time, that there be some gathering later on, of just industrial men, who would come there ready to discuss and criticize and possibly take more definite action on reports that were presented than was possible at this general meeting, and to properly go over each question and have discussion from all. This was decided upon, and a gathering of industrial men will be called together in about a month.

I. Lundgaard, sub-chairman of the committee on industrial fuel, read his paper on furnace performance standards. This is an important subject to the gas man, as at present there is no standard performance and the need is great. Mr. Lundgaard said that anything at all that will be done will be better than the condition existing at present as there is nothing now. That it is not a question of something better in the matter of standard furnace performance, but a question of doing something at once. Plans were submitted to the committee by O. Lellep, an engineer of the Surface Combustion Company. Mr. Lellep said that the standard performance specification would protect against the manufacturer who makes a cheap furnace and sells it now on salesmanship. Mr. Lundgaard said that there are certain types of furnaces on the market to-day that should be buried. This subject proved to be such a big one for the gas man, and there has been so little done so far, that a motion was made that this paper should be printed and sent out with an invitation for written discussion. That all should be made familiar with new processes. There was a general opinion among the men present that much of the business in the future will be conversions of furnaces to gas because of the high prices of coal, and that therefore a standard performance specification is imperative. Mr. Lungaard said that because the gas industry has no special standard performance specification, the buying of a gas furnace is very much like the buying of a cat in a bag. R. B. Reed, of Young Brothers, manufacturers of ovens, asked that the manufacturers be taken into the discussion, and that the committee consider the question of standard performance specifications as much as it can from the standpoint of the manufacturer, which, Mr. Reed said, is the standpoint of the customer.

At the meeting of industrial men only which was decided upon to be held in a month, the manufacturers of furnaces will also be called upon.

At this last meeting of the commercial section, R. V. Howes, of the Consolidated Gas Company, New York, presented a paper on "Getting and Keeping the Hotel Business." Mr. Howes, however, did not read his paper, as he knew it all by heart and he gave it to the audience from the heart. Mr. Howes said that the gas man, first of all, should have faith that gas is the only fuel. Mr. Howes said he believes in gas, and without doubt everyone present believed with him because he spoke firm conviction. Mr. Howes said that New York gas men *have* the hotel business and they keep it with *service*. Faith and Service was the keynote of Mr. Howes' gas gospel. Questions were asked of him regarding the New York company's methods of maintenance. Also as to how they meet the competition of the hotel equipment companies, for whose ranges the architects' plans are laid out for. Mr. Howes said they always successfully meet that competition because they give maintenance and service with their own installations of ranges; that no matter how the architects' plans are laid out for other ranges, the company, if necessary, has the plans changed and install their own ranges. Mr. Howes said that it is not for the small profit on the sale of the range that they are after, but it is so that they can give *service*, and because they give maintenance they can convince the hotel man in favor of the company's range no matter how strong the competition is from the hotel equipment company. Mr. Howes spoke of the need of real salesman. He said do not send an engineer to sell the hotel man—let him be an engineer if he wants, but he must be first and last a salesman. He said the salesman has a deaf ear to the word "no," but he can hear the word "yes" in only a whisper clear from across the room. He told of some salesmen the New York Consolidated Company has. He said one man comes in with a blank order sheet, signed, and says: "Here is an order, fill this in with what we are going to sell this man." "First and last he must be a salesman," Mr. Howes repeated often, but his last word was "service."

The Exhibit of the American Gas Association Convention

The exhibit proved to be a big feature of the convention of the American Gas Association. It was the general opinion that this exhibit was the largest and finest that has been shown during a convention of the gas industry in many years. As well as being the largest and finest one, it also proved a most profitable one. Reports from the salesmen all claimed big business done. All day long throughout the entire week the booths were crowded with visitors and buyers. Some booths were extraordinarily crowded. This was so in the case of those companies who showed some novelty or some new product.

John J. Griffin Company

The John J. Griffin Company's booth was crowded continuously. They had on exhibit a large gas meter, type 150A, painted bright red, standing on a white base. This meter was running with all parts showing, exposed valves and diaphragms. It was quite a novelty. Many people there had never seen a gas meter in operation, with these parts exposed, and it attracted a great deal of attention and interest. Besides this meter, the company also had on exhibit their regular line of meters. Around their booth were hung photographs of large industrial installations in the city of Philadelphia where their meters are in use. One was a picture of the United States Mint, showing the whitening process of coins, which is done with gas fuel. Another was a photograph of an installation in the Bell Telephone Company building showing three 150A type meters and one 300 hp. gas engine and one 55 hp. gas engine. Another picture was of the Fairhill Emergency High Pressure Station which showed a 300 hp. gas engine.

The Sprague Meter Company

The Sprague Meter Company's exhibit was one of the interesting ones. In addition to their regular line of domestic meters they showed their new 1D Slide Valve 4 Chamber Meter. At the present time the company is only making this meter in the initial size. They were also exhibiting a new feature of their No. 1 Regulators—the interchanging principle of the oil seal and mercury tube and cup. Four of the company's men were in attendance and were continuously busy.

The Precision Instrument Company

The Precision Instrument Company had on exhibit their new instrument, the "Precision Calorgraph," which was brought to the convention from their laboratory, on which experiments have just been finished. There are certain mechanical refinements on this instrument which make it more correct than their former instrument. Two problems have been met in this instrument. One is the regulation of the flow of the gas to the burner in such a way that there is a fixed quantity of gas irrespective of its specific gravity. The second problem is, the gas is burned and the heat units are recorded by the products of combustion impinging upon a diaphragm which expands and moves an indicator on a sixty-day chart. The instrument has so been designed that it compensates not only for variation in specific gravity of the gas, but also for variations in room temperature and atmospheric pressure. Added to these refinements, tests show an accuracy of about 1 per cent.

The Precision Instrument Company has also made recent mechanical refinements on its Specific Gravity Recorder. The newly improved instrument was on exhibition. These mechanical refinements have been made in connection with the reduction formulæ furnished for variations in atmospheric temperatures and pressure and accuracy of about seventy-five one hundredths per cent.

The Surety Attachment Company of Nashville, Tenn.

Useful novelties and inventions were not wanting at the exhibit and of the many that were shown, a safety lock for the keys of a gas range, made by this company, was one of the important ones. It was widely sold at the convention to both the stove manufacturers and the gas companies. The gas companies will also have this safety attachment on sale for consumers to purchase and place on their stoves. It is a very simple arrangement which any person can attach to the gas range. It is a long flat bar made of cold rolled steel, nickel plated. It fits any make of range. In putting it on the range, it requires no tapping of the manifold, it simply clamps around the manifold. The joint has a lock nut which does not turn around. When the safety lock is locked it rests pat against the keys of the gas range, protecting them from accidentally being turned on. It is a safety device of advantage on every gas range but one that is a practical necessity in homes where there are children.

The A. H. Wolff Gas Radiator Company

In addition to their Pressed Steel Gas Radiator, the Wolff Company had on exhibition their sanitary gas toaster which has only been on the market three months. The toaster was demonstrated in the company's booth by a neat trim looking and very pretty little girl dressed in a white apron and white cap who made toast for the many visitors to the booth. She proved by actual showing that the toaster browns bread to your liking, and toasts it evenly, and does not burn the crust. It is collapsible, is easy to keep clean and can be used on any gas range. This toaster has had a phenomenal sale both at the convention and during the three months it has been on the market. The Public Service Company of New Jersey has been featuring it in all their salesrooms, and have also used it extensively for window displays. The U. G. I. Company of Philadelphia have also used it as a window display feature. The Wolff Gas Toaster and its demonstration made the company's booth one of the most popular ones at the American Gas Association convention exhibit.

The Safety Gas Lighter Company

The Round File popular gas lighter made by this company received its share of considerable attention. The company's representatives in attendance at their booth were busy people. This lighter was in demand by the gas companies for sale. It is also extensively used in shops for soldering and welding for lighting torches.

The Young Bros. Company

This company, builders of ovens for japanning, etc., had on exhibit a skeleton oven, showing the direct and indirect methods of heating by gas. The skeleton oven exhibited

was the more or less familiar panel construction type, the individual panels consisting of sheet metal, which encloses a high grade heat insulating material. This construction enables it to be factory made by special machinery, and to be assembled on the ground. This feature also enables it to be disassembled and removed to a new location, and even to be rebuilt into an oven of different size or style if the future production changes make it advisable. The indirect type which is the one strongly recommended by this company for japanning purposes, has been developed to a point of very high efficiency, and there is very little unused heat. This type oven is gaining a very strong foothold in factories where high grade castings are made. A few of the industrial plants in the country, where these ovens are in use, are the American Metal Cap Company, American Steel & Wire Company, Budd Wheel Corporation, the Navy Yard in Washington, D. C., Worthington Pump & Machinery Company, Chevrolet Motor Company, etc.

Roberts Brass Manufacturing Company

One of the most attractively and uniquely arranged booths at the exhibit was this company's booth. One on the chief products is gas cocks. They had all the different types of gas cocks that they manufacture displayed on a great big green growing plant, with long branches. On the end of every branch of the plant was a gas cock. Above the plant hung a large picture of the company's works in Michigan. Mr. Roberts, a member of the firm, explained that they had two gas cock "plants," pointing to the plant in the picture, and then to the one growing the cocks that they had brought with them. They also exhibited a mammoth sized cock mounted on a velvet pad, with one beside it of regulation size, and beside that one a tiny minature cock. This gas cock booth attracted much favorable comment.

The Welsbach Company

The Welsbach Company's booth was a popular one, especially to the children visitors. They were exhibiting for the first time their "Thrift Heater." The "Thrift Heater" was placed on a revolving table. Everyone was invited to guess how many times the table revolved during the day. A "guess card" was given to each person for the purpose of writing down his guess of the number of revolutions. An indicator underneath the table told at the end of the day the number of revolutions. Each day the person guessing nearest the correct number of revolutions for that day received a prize of a "Thrift Heater." The Welsbach Company's booth was also made unusually attractive with a display of indirect gas lighting fixtures.

The Schaeffer & Budenberg Manufacturing Company

A. E. Campbell, of the company's service department, was in attendance at the convention exhibit. On display in their booth were their regular line of recording and indicating thermometers, and pressure gauges, including the "Crescent" thermometers, "Columbia" recording thermometer, "Redline" differential draft gauge, "S. & B." gauge, "Columbia" recording gauge, Siphon or "U" gauge, a tachometer and a hand tachometer, an engine register, a counter and the "Schaeffer." Mr. Campbell had the booth arranged to good advantage, and the instruments made an interesting display.

The Bartlett-Haywood Company

This company occupied a booth in which they displayed a photograph of the largest gas holder in the world. They also had on display four photographs of their four plants in Baltimore, one of the main plant, and the Park plant, the Turners station plant and the Smith plant.

The Perfect Combustion Company

This company had on exhibit their "Nu-Styl Gas Irons." One of these was a "gold" iron, which was made especially for the convention exhibit. It was a winner with the women folks, not alone from the standpoint of its beauty, but on account of its mechanism as well. It is entirely free from any gas odor. With even going as far as putting one's nose right down to it, not a bit of gas odor could be detected. This iron has other features as well. It is an exceedingly simple one to light and simple to regulate. The automatic attachment which is on it regulates the air for perfect combustion no matter what the flow of gas is. Another feature of it that is important, from the standpoint of the user's convenience, is the cord or tubing, which is arranged at elbow length from the iron, making it impossible to get in the way while ironing. This is one great disadvantage of the electric iron. The cord continually gets in the way, which is a more or less nerve-racking inconvenience for the ironer.

The Superior Meter Company

J. F. Smith represented the company at the convention and was in attendance at this booth, where they had on exhibit their entire line of gas meters of various types—calorimeters, high pressure flow meters and siphon gauges, etc. They were showing a special meter, which as yet is not in use. This meter registers dollars and cents, according to the amount of gas used, and can be regulated according to the price of gas per cu. ft. obtained. It is believed that this meter will eliminate a great amount of bookkeeping that is now necessary.

New Process Stove Company

There were many gas ranges on exhibit, each one having some admirable feature that would make it a difficult problem upon which to decide.

But of all these, there was one that would necessarily have an especial appeal to the woman who does her own cooking, that one is the "New Process" gas range with the "Lorrain" oven heat regulator, which is an automatic attachment that controls the gas continuously while the fire is burning. This regulator does all that the fireless cooker does, as well its regular oven "duties." It combines the utmost of simplicity with eliminating a great waste of time that many women must needs spend in "pot watching." It is operated by merely turning the indicator on the regulator to the degree of heat necessary for the length of time in which it is desired to cook the bread, or pie, or roast meat, which degree of heat has been all worked out and is given in the direction chart. No further care is necessary—it works like a charm.

There were many other exhibits of great value and interest which it would take many pages to describe. The exhibit on the whole combined invention, facility and beauty. And the good results obtained far exceeded the time and effort that had been spent on the convention's exhibit to make it the finest one that the industry has ever seen.

Vertical Retorts Lend Themselves to Steaming with Better Results than in Case of Horizontals

(*Continued from page* 371.)

are kept fairly constant and the coke is not reduced to an ash. In the generator of a water gas machine there is a wide fluctuation of temperature in a short interval of time, and the coke or coal is burned to an ash. In many cases the ash fuses and adheres to the generator lining, and has to be removed with a slicing bar. It is this last operation which causes most of the wear and tear on the lining.

Superheated Steam

Apparently there is no question as to the necessity for using superheated steam when steaming horizontals. As for the verticals, there seems to be some divided opinion among the gas engineers who are steaming, but the majority of them believe that better results are obtained with superheated steam.

The steam can be supplied direct from a boiler or can be generated by placing a generator and superheater in the bench. Another convenient arrangement would be to use a double length of extra heavy pipe connected at one end with a return bend and place it in a waste gas flue. In using any of the above types of superheater it is necessary to keep a constant flow of steam through them or they will burn out. The superheaters should not be allowed to become red-hot, as steam in contact with red-hot metal is decomposed into hydrogen and oxygen.

Objections to Steaming

The following are some of the disadvantages of, or objections to, steaming that have been cited:

1. Increased operating costs due to the steam required.
2. The amount of steam used per 1,000 of water gas made is many times more than required to make water gas in a water gas machine. If blue water gas is to be mixed with the coal gas it would be more economical to generate it in a regular water gas machine and then mix it.
3. Diluting the ammonia liquor and thereby reducing its strength.
4. Increased operating costs, due to additional bench fuel.
5. Latent heat carried away by the superheated steam leaving the retorts with the gases, thereby requiring additional condensing equipment.
6. Additional expense due to supervision required.
7. Decrease in the amount of coke produced.

The above objections to or disadvantages of steaming may be answered as follows:

1 and 2. It is true that the amount of steam used per 1,000 of additional gas made is more than that required in a regular water gas generator. While no figures have been published on the amount of steam used in steaming horizontals, the amount used in steaming continuous verticals, calculated from the data given, averages between 65 and 70 lb. of steam per 1,000 of additional gas produced. The amount of steam used in a regular water gas machine will run between 45 and 50 lbs. per 1,000 of blue water gas.

If the cost of the steam used in steaming retorts is excessive in any given plant, there is usually a considerable amount of exhaust steam around the average gas plants which could be used, even if it is necessary to make some of the pumps work with 2 or 3 lb. extra pressure. That does not materially affect the efficiency of the pumps. Working under 5 lb. back pressure only drops the efficiency about 2½ per cent. The steam could be superheated by utilizing some of the waste heat in the retort setting by passing the steam through a coil placed in one of the waste gas flues.

Even though the amount of steam used in the steaming process is more per 1,000 of addition gas made than with a regular water gas generator, it is cheaper to make the additional gas in the retorts because by so doing additional capacity is obtained without any additional investment charge for gas generating equipment.

3. It is true that some plants which experimented with steaming filled their ammonia wells with weak liquor. The trouble was probably due to using too much steam or to improper regulation of the heats, etc.

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Unsold Market for Gas So Much Greater than the Sold that No One Need Worry as to Its Limits

(*Continued from page* 358.)

has no control make it seem advisable, he and his whole department may be at liberty to accept other employment upon very short notice. That is present fact and history.

If this picture of the standing of the so-called new business department is even half-way correct, is it to be wondered that so many far seeing young men eager for success by the employment of their commercial acumen, leave the gas industry at the first opportunity? The lamentation of the industry over this exodus from its ranks may be sincere, but it is none the less ludicrous in view of the absence of intelligent effort to stop it.

Is commercial training of so little value to the gas business that only the department where men of commercial training might expect to find free play to their talents is so throttled and handicapped as to afford them little hope of advancement in station or earnings?

Is it not a paradox, if the gas company is commercial, that the scheme of things is such that the men in those departments where commercial talents count the least have the greatest chance of advancement and the assurance of permanency of employment?

Does not such a condition smack more of the fanciful satire of Gilbert and Sullivan than of the cold, supposedly sensible, business world?

Does not such a condition, which if it be not true, is at least generally believed, make the promotion to admiral through polishing the handle of the big front door seem like a burst of intelligence?

If the inference be drawn from the foregoing that the new business department should be charged with authority over all other departments of a gas company, it is almost a correct one. Why not?

Why not have done entirely with the "new business department"? Its very name shows it to be an anachronism, the first effort of a growing tendency to reform. It must be followed in all logic by an "old business department" to see that the new business which the "new business department" gets is taken care of in such a manner that it is retained. Nor should there be reluctance in progression. The gas company is not alone in its probings. At the recent convention of the Associated Advertising Clubs of the World, a prominent banker presented a paper to the Financial Advertisers Section on "The Need for an Old Business Department." Banks, too, are beginning to think along commercial lines.

Scrapping the Old Idea

Why not scrap the old idea? Why not at one step line up with all other commercial institutions and erect a "sales department" and let it assume the burden, as in all other successful businesses, of all public relations from the signing of an application to the delivery and connection of a hot plate? Why should not the sale of appliances be but one function of the sales department? Why should not the men in that department be well paid with an assurance of free play to their talents and permanence of employment during good behavior? Why should not the manager of the sales department be in direct line for promotion to the general managership and be given authority over and held responsible for the purchasing of appliance stock, the operation of delivery, stockroom, connection and repaid departments; in short, vested with all those duties and authorities usually vested in sales departments in ordinary businesses?

No business on earth save the gas business, from the smallest to the largest, would for a moment think of permitting its sales department to operate under the handicaps now imposed upon the new business department of the gas business. If it be argued that in many cases the men now in charge of new business departments are not capable of the advancement and authority suggested, what does that prove but the need for drastic reformation of a system of management which would permit these incompetents to remain?

The creation of a sales department placed where it belongs in the scheme of things, would automatically eliminate the surly clerk, the impudent fitter and the indifferent salesman. No sales manager worthy of the name would permit his hard-won customers to be ridden roughshod by employees of departments over which he had control.

Nor does all the menace to good-will lie in the humbler employees of the gas company. Picture a manager of the gas company risen from the sales department. Could he be otherwise than a continuing asset on the balance sheet of good-will?

While in the interrogative mood another question may be asked. What is there in the gas business which inspires in its average executive the idea that he must cloak himself in a veil of mystery, surround himself within a wall of pomp and dignity that baffles all who approach from what he seems to consider a lower plane? It cannot be the size of the business. Scarce a city where the gas company is the largest institution. Surely not because of justifiable independence. No business in the community is more dependent upon goodwill and popularity. Why then, except from musty tradition based upon nothing, as so many traditions are?

How refreshing to the world to see a gas company president or manager acting like a human being, broadminded, active and interested in civic welfare, Chambers of Commerce, Rotary or Kiwannis and other bodies where real men meet upon a plane, "living by the side of the road where the race of men goes by."

Is it forgotten that the average citizen, if he sees the gas company as a personality at all, sees an alleged grafter in close alliance with a political gang or a floating miser chortling over the clinking coins filched by pumping wind through the meter in the "wee sma' hours"?

Why should not this picture be replaced in the public's eye by that of a broadminded, public spirited citizen, alert for public service, zealous in community work, eager to serve in all movements for the town's welfare, anxious to give and receive only a square deal in business? Could the value of such a picture be overestimated? And how much would it cost? A few dollars in dues and expenses and the scrapping of a worn-out ridiculous and irritating mantle of pussy footing and pomposity.

When the public sees the gas company as such a personality, is received by a sales department wherever it does business with the gas company, and is accorded a treatment by the gas company such as it now receives from other business houses in all lines, will it not be more ready to accept the advertising and other approaches from the company in a more kindly spirit? Politicians would find it of little profit to berate the company and hold-ups would be impossible. Other difficulties would also disappear. If this seems prophecy, let it be known as proven facts.

House in Order First

With its own house in order, the gas company may then hope by scientific methods to reach out for the "unsold market." To reach out for that market in the present state of the industry shows an utter incomprehension of the main obstacles.

The gas company route to the consumer and the public is at best but a single track route. The volume of business offered warrants a double track at least. If, using a simple analogy, the gas company were a peanut stand, it naturally would want no other peanut stands near it. If, on the other hand, its business were to get as many peanuts in the public's stomachs as possible, it would want as many peanut stands in existence as possible, and if it had to run its own peanut stand as well, it would see to it that its stand sold only the best peanuts and at a price which would not make the other stands unprofitable. It would achieve, thereby, two important things—educating the public taste to the best peanuts and helping all other peanut stands to do business.

Are we not almost ready to acknowledge that gas is the supreme fuel? Is it still necessary to cling to the old idea that the public will blame the gas if a poor appliance is used? May we not safely assume by now that a public able to discriminate in all other lines, may safely be trusted to tell a good appliance from a bad one, especially when a concern in which it has confidence offers good ones? If so, is it not

to the interest of the total gas sent out to get as many dealers selling approved appliances as possible? Is it a businesslike attitude of mind to view the action of a dealer in selling an appliance as that of an enemy, or the action of a consumer in purchasing an appliance of a dealer as that of a traitor? Is the gas company a peanut stand or a distributor of peanuts?

Should not the many outlets for gas appliances be utilized to the best advantage? Why should not electrical dealers, plumbers, specialty houses and others coming daily into close contact with the public, be made channels for carrying gas appliances into homes? If the gas company does not want to job appliances, why should not the manufacturers sell direct to these other outlets without being subjected to boycott by the gas company?

Is it fair to the manufacturer when placing an order with him for hot plates, to deny him the right to sell ranges in the city?

In the business world, to have a number of dealers selling not only the same kind but the same make of appliances, is held to be desirable by both manufacturers and dealers as well. A walk down Main Street discloses many shops selling Kodaks, Victrolas and Fords, to mention a few of the more conspicuous lines only. Why should it not be so with gas appliances? Difficulty of adjustments? Safety of installations? The public plays at its own free will and accord with automobiles, coal appliances, oil stoves, coal tar drugs, electric irons, dogs, cats, horses and hair dyes and a thousand other more or less useful and useless commodities far more dangerous than even the worst of gas appliances and yet it lives, thrives and comes back for more. The gas company doesn't seem to know that the public is in long pants. The public doesn't want advice and fatherly care. It wants comforts, conveniences and pleasures and is willing to pay for them.

The newly organized advertising section sets forth the nucleus of a plan by which the acres of space now paid for as policy advertising (but generally charged to the new business department just the same, and filled with the rankest kind of "bush league" copy), are going to be utilized in an intelligent result-bringing way for the benefit of the industry. Whether this section of the association will be able to line up the isolated companies with the forward looking men of the industry is a question. There is no question, however, about the fact that united action along progressive advertising lines, the suppression of harmful, untruthful publicity, and the positive program for the dissemination of the truth about our doings, will make for a better understanding on the part of the public and go far to lessen the selling problems now confronting us.

This association will be able to support a research laboratory for promoting varied uses of gas and the publication on, for the benefit of all, of authentic figures, on the various applications of gas in home and industry.

A statistical bureau which will be able to present accurate statements on all phases of the industry, will, no doubt, be a part of the association's work. Closely related to it, and perhaps as a result of it, there may spring a service which will standardize procedure and arguments before commissions and which, it is to be hoped, will do away with the present ludicrous spectacle of neighboring companies with like conditions presenting conflicting claims based, often, upon suppositions instead of on facts.

Manufacturers, too, in the light of changed conditions, will be more willing and able to perform the duties they must face. With an open market they must advertise generously and consistently. A very few so far have indicated the trail; no one has really followed it.

Standards of Appliances Must Be Maintained and Improved

Standards of appliances must be maintained and improved. Perhaps some manufacturers may feel a call or see an opportunity to profit by making unworthy appliances. If such there be, their treatment by the entire industry should be that accorded to traitors. Fortunately, the maintenance of a high standard by the great majority, backed by consistent advertising, will lessen opportunities for such lapses, for this is a day of trade-marked goods and no trademark not backed by merit can long survive.

Twice in four years have the manufacturers of appliances, while running under a full schedule of production and with warehouses stocked with goods ready for the market, awakened to find their entire distribution machinery utterly broken down, with no way to get their wares to the public and with the carefully educated personnel of their retailers scattered to the ends of the earth. Upon neither of these occasions was there, with the exception of a few situations, any sound commercial excuse. No other manufacturers found themselves faced by a universal panic strike of their distributors. Business went on, if not as usual, at least as unusual, but it went on. Even now, when faced with a market, beside which former market seemed small, the gas trade is apparently making little effort to reach it. To have kept silent in the face of present conditions would be almost craven and if, therefore, it falls to the lot of the manufacturers, speak, let it be so. No criticism is leveled at any one person or company. If it would appear so, then, indeed, has some good been done, for that which is so recognized must be true, and the beginning of profit is cost keeping.

A new day is dawning in the industry and it will be met with hope and readiness for what it promises. Much of what has been said in this paper might have been quoted from men whom the industry recognizes as leaders. Many of the suggestions come not from theorists or those unexperienced in the gas world, but from concrete examples of prominent men and companies.

Therefore, with these thoughts of progress, from these examples of modern management and with the co-operation and service of the American Gas Association, he is a pessimist indeed who can view the future as cloudy. The gas industry is but a step from a realization of the dreams of those who have labored so long in it. Gas is ready to-day to answer the call for the universal fuel that will make life easier for millions of people, that will set the home life of America upon a new plane of sanitation and comfort. Only an awakening of the latent power in its possession, just a realization of the direction its efforts should take, and the industry will find itself in what has already been called by one who has sensed the spirit of the times, the AGE OF GAS.

Vertical Retorts Lend Themselves to Steam with Better Results than in Case of Horizontals

(*Continued from page* 386.)

4. There is a point which is generally overlooked in connection with the question of increased generator fuel caused by steaming and that is the enormous amount of heat that is stored up in the incandescent coke, which undoubtedly helps in superheating the steam and materially reduces the amount of any additional heat that would have to be supplied at the expense of the generator fuel.

5. If the proper amount of steam is used there should not be any excessive amount of steam in the gases as they leave the top of the retorts. In the intermittent system of carbonization, any steam in the gases would necessarily carry with it the latent heat absorbed in the superheating. With the continuous systems of carbonization any latent heat in the gases would be absorbed to a great extent by the green coal entering at the top of the retort. The need of additional condensing equipment is very doubtful for the reason that the temperature of the gas by the time it reaches the primary condenser is usually around 150 to 160 deg. Fahr., and is saturated with water vapors. Consequently it cannot be increased by steaming.

6. In order to obtain the most efficient results, the steaming process requires a certain amount of supervision, especially in connection with the regulation of the amount of steam introduced into the retorts. This could be done by the man whose duty it is to look after the regulation of the heats, etc. As for the periodic cleaning of the flues, this should be done regardless of whether the steaming process is used or not.

7. The amount of coke that is used up in the water gas reaction is very small unless the gas production is increased more than 40 per cent as most of the actual water gas made comes from the scurf carbon on the sides of the retort. Even if the coke production is decreased, is it not the aim of the gas engineer to get all the gas he possibly can out of a ton of coal? Besides the saving effected in the amount of coal used, saving in labor and overhead expenses will more than offset any loss caused by a reduction in the amount of salable coke.

Advantages of Steaming

The following are some advantages that may be obtained by steaming:

1. Increased capacity of plant and a reduction in labor and overhead charges.

2. A possible increase in gas made per ton of coal ranging from 10 to 50 per cent.

3. Increased tar production.

4. Increased ammonia production.

5. The formation of carbon on the sides of the retort is reduced by 40 to 50 per cent. The carbon that is formed can be more easily removed or burned off, thereby effecting less wear and tear on the retorts.

6. With horizontal retorts the stoppages in the standpipes will be eliminated to a great extent, thereby improving the operating conditions.

7. The gas made will have a lower air to gas ratio with a resulting increase in the flame temperature. It will be more uniform in composition and will contain less of the non-combustibles.

In National Advertising State the Facts—Tell the Truth and Let the Consumer Form His Own Opinion

(*Continued from page* 348.)

It takes time for facts and policies to be known all over a country as large as the United States; it takes persistence, determination, tremendous force behind an advertising campaign, and it also takes a willingness on the part of the producer and the advertiser to be known for just exactly what he is. As Lincoln well said, "You can't fool all the people all the time."

Failure in Lack of Persistence

I am told by men of great experience in the advertising field that many a campaign of national advertising has failed because of the lack of persistence, because results were expected in too short a time, and instances have been cited where a campaign which might have been tremendously successful ended in failure because it was stopped just a little bit too soon. There is a gigantic cumulative force in persistent reiteration and presentation of a product which is nationally important, and when you have secured this accumulation of force it is remarkable how long the benefits last.

Advertising has a great value in helping to keep us up to a very high point of efficiency. Almost every advertisement which we put out calls forth expressions of criticism. A man out in Missouri or Oregon or some other place reads an advertisement. He remembers some experience wherein he considers our performance has not lived up to the promise in our "ad," and he writes in and calls attention to what he considers is our insincerity. He usually winds up with some such remark as this: "If you would pay less attention to and less money for advertising and more attention to your service it would be better."

Value of Criticism

We welcome just such letters. We need to know when our product is falling below the standard we claim for it. Unfortunately, we are not manufacturing a product which can be inspected when it is finished and before it is placed upon the shelves for sale. We cannot see it, we cannot measure it with calipers to know that it comes up to the specifications, and therefore we welcome an honest statement from the man who knows that something is going wrong. The more we claim in our advertising the more must we deliver in our service. I thoroughly believe in hitching our advertising wagon to a star, and then striving to live up to the standard we set. Such advertising brings forth the highest type of endeavor. It is like the heart of Bruce thrown ahead of the advancing Scots. He who is content with a mediocre product may advertise it as such without fear of criticism, but he who strives for the best and adver-

tises his endeavors in that direction must necessarily invite criticism if his product is not always perfect.

Not the Intention to Increase Business

The corporation which I have the honor to represent, and which spends large sums of money each year in national advertising, does not do so with the direct object of inducing people to subscribe for telephone service. Our chairman, Mr. Vail, has said to me over and over again, "You must keep out of your advertising anything in the nature of an invitation to purchase telephone service; get away from the commercial idea." Well, that is a pretty hard thing to do, but we have conscientiously tried to do it.

We advertise in a national way because we serve a nation-wide public and we want that public to know all about our business. We have intricate problems; we want the people to understand them. We have lofty purposes, and we are entitled to have them known. We have high ideas as to civic service, and you can readily understand that a corporation doing business in some 70,000 places in the United States needs some measure of sympathy with its tremendous difficulties from the public it is trying to serve. We believe some great fundamental principles are applicable to our business—such as the necessity for one policy as regards the general use and protection of every telephone in the United States. We believe in one system, because we cannot conceive of a nation-wide service being performed by numbers of unrelated companies. We believe in universal service, because the ultimate benefits incident to telephone service obviously cannot be given or received in a restricted territory.

Perhaps the one great test that can be applied to our national advertising is to consider whether or not it has made these problems, purposes, ideas, difficulties, principles and policies known throughout the United States. If it has made them known, and to the extent it has made them known, our national advertising has been a success; but if we have spent these large sums of money without that result, our national advertising has not accomplished the purpose we have had in mind.

As men considering advertising, I am pleased to tell you that, in our opinion, our campaign in these particulars has been a success, and there are many evidences which go to confirm our belief in this direction.

But I must confess to you that I am up against it. In spite of our endeavor to follow out Mr. Vail's instructions, the record shows that we have not been successful, and I tremble when I realize that he is sure to learn that somewhere or other the commercial idea must have crept into some of our advertising without our really knowing it. We have often stated that we could not key our advertisements or directly note results in the way of increase of business, but a study of the figures shows a very gratifying result when viewed merely from the commercial standpoint.

Our national advertising campaign began in June, 1908. We will assume that the advertising has affected only the number of Bell telephones as shown in the annual reports of the American Telephone & Telegraph Company. The stations of our connecting companies, private line stations, etc., have been omitted in making up these figures. For the five years of 1904 to 1908, inclusive, we gained 1,690,078 subscribers, and this gain was 1.72 telephones for each 100 of the total population of the United States. That was before our advertising campaign began.

Now let us take the period from 1909 to 1913, inclusive, omitting, as you will note, the years 1914 to 1919, in order to avoid the effect of abnormal conditions due to the European war. During these five years, while our advertising campaign was in progress, we gained 2,199,964 stations, and that gain was 1.95 telephones per hundred of the total population of the country, so that during the period covered by our national advertising the gain in telephones was 0.23 of a telephone in every hundred of the total population of the United States greater than during the period when we were not advertising. If you will apply this 0.23 of one telephone in every hundred of the total population of this country you will notice it represents a large number of telephones. And this gain was made in spite of the fact that the possibilities for new business were considerably less in the latter period than in the former period.

Results!

Suppose we consider a moment a comparison between the gains in Bell telephones during the five-year period contemporaneous with our national advertising and the gain in telephones in the more important systems in Europe having government ownership during the same period. Let us take the years 1909 to 1913, inclusive. During that five-year period France gained 133,947 telephones, or 0.34 of a telephone per hundred of the population of the country. Switzerland in the same period gained 27,502 telephones, or 0.61 of a telephone per hundred of the total population of the country. The German Empire gained 568,781 telephones, or 0.75 of a telephone per hundred of the total population of the country, while, as we have seen, in the United States the gain in Bell telephones alone was 2,199,964 telephones, or 1.95 telephones per hundred of the population of the country. In other words, eliminating the effects of differences in population, the gain in Bell telephones in the United States was over two and one-half times the gain in the German Empire, over three times the gain in Switzerland, and almost six times the gain in France.

Now, you may account for this difference in any way you choose. It would probably be impossible for anybody to assign all the causes both for the difference in the gain in the two periods which we have noted and also for the differences in the gain between this country and countries in Europe; but you men know the facts just as we know them, and before a company of men about to consider a campaign of national advertising, I am not going to shirk the responsibility of admitting that somewhere, without my knowledge or consent, there must have crept into our advertising something of a commercial nature.

Stretching the Length of the Long-Distance Call

I am going to venture to add just one more line of statistics to those I have already given you. All of you have probably been made aware that we have built a transcontinental telephone line extending from New York to San Francisco. It has been advertised in a national way by many different mediums, and this has

had a very remarkable result on our long-distance telephone business. In the year following the opening of the transcontinental line the average length of haul of all the messages carried over the lines of the American Telephone & Telegraph Company increased nearly 25 per cent. Is this not a truly remarkable result of the education which the people of the United States have received through advertising the invention and development of the necessary facilities for long-distance telephony?

There are probably few national advertising campaigns wherein it is as difficult to trace results as in that conducted by the American Telephone & Telegraph Company, but the above facts speak for themselves. The statistics we have considered could be translated into terms of the dollar, but it would be impossible to estimate the benefits which we have received because of the education of the public concerning our business. We cannot calculate the value of an enlightened public interest and knowledge in our affairs, but the benefits are apparent in hundreds of different ways.

One should not address an association considering advertising without mentioning a great ideal which has been adopted as the motto and slogan of the Associated Advertising Clubs of the World. It consists of the word *"Truth."* National advertisers as a class, it has seemed to me, are coming a little nearer to the ideal of "Truth" than those who are confined more closely to local fields. Perhaps this is not so—I certainly do not mean any offense in expressing it as my belief. Indeed, it is rather natural that we should hesitate in spending very large sums of money in circulating anything that is not entirely true. But I do know from observation and experience that the great endeavors of the Associated Advertising Clubs in the direction of truth are bearing a magnificent fruit.

Truth is essential, and the nearer we arrive at truth in all our advertising, the more valuable will that advertising be. Consider of how little value the advertising of the American Telephone & Telegraph Company would be, even though it might express nothing but the exact truth, if the copy of every other national advertiser should be full of lies. In such an event we should be in such bad company that no one would believe us, and our advertising would be absolutely valueless. But, on the other hand, suppose that every other national advertiser was telling nothing but the exact, unvarnished, eternal truth. Then what a glorious company would we be in, and what tremendous weight and value there would be in every statement of our copy. Indeed, I will go so far as to say that national advertising or any other kind of advertising is going to succeed in the future just in proportion to the extent that it is honest and true.

The more I think about advertising the more I am convinced that every article produced for the consumption of the human race must necessarily be advertised, because in almost every instance of production in the present age there is a surplus in production over what the producer can possibly consume. Philadelphia cannot utilize all her steel products; the farmer cannot possibly require all the products of his acres. We are all specialists, none of us is self-sufficient. We must know much about what the other man produces, because we consume his products and we are entitled to protection in the diffusion of knowledge which results in education through advertising. Very few of us produce anything which we consume. Everything must be bought. We have not the time nor the knowledge to examine what we buy. Anyone could defraud you and me with false statements. The old legal doctrine of *caveat emptor* should no longer apply. The buyer cannot beware, because he has neither the time nor the technical knowledge to examine the things he purchases. We must be protected in the statements in the advertisements, or we shall continually be defrauded.

Not only is it true that every article offered for the consumption of the human race must be advertised, but every great cause in which we are interested demands that same treatment. The intricate modern methods of production, transportation, communication and consumption have brought men closer together in mutual interests than ever before in the history of the world, with the result that that which affects one class of men or one nation or one locality of the world also affects every other class of men, every other nation, every other locality, and this makes necessary an accurate, complete knowledge of great causes and great events, no matter how far they may seem to be separated from our immediate environment.

National advertising secured the Panama-Pacific Exposition for San Francisco after all other methods of persuasion had been tried and a rival city had practically grasped the coveted honor.

National advertising has secured hundreds of manufacturing plants for cities which have made known in this way their advantages as manufacturing centers.

Has Improved Methods of Doing Business

National advertising has improved methods of doing business in hundreds of different ways. It has taught many firms to know more about their own business in order that it might be intelligently advertised.

I need hardly recall the wartime advertising. All the nations involved in the war, as you will remember, found it necessary to advertise in order to convince their own people, the rest of the world and God Almighty that the individual causes for war in each nation were the only just and righteous ones.

You all remember the food-saving campaign, which won the co-operation of the entire nation in self-imposed denial. If advertising can convince people they should give up white bread and sugar, nothing is too difficult! No one will deny that national advertising sold to the public the various issues of Liberty Bonds and extended the number of bond buyers to some twenty millions. I dare say, as a result of advertising some of you men sent your telescopes and field-glasses to the navy in order that the officers of our fleets might be supplied.

Perhaps the most remarkable development of advertising in the war was that phase which has been called propaganda and which was indulged in to such a great extent by Germany. But later in the war the Allies turned this great weapon of offense upon their enemies. In *Harper's Monthly* for September there is an article entitled "How We Broke the German Morale." If anyone has any doubts as to the tremendous effects of well-conducted propaganda, I advise him to read that article. I believe it is not too much to say that the mere fact that millions of leaflets were distributed over the German lines with such statements as Secretary Baker's monthly reports on troop movements from America to Europe, President Wilson's reply to Austria's bid for peace, and the de-

flections of Turkey, was one of the great, if not the greatest single factor in causing the discouragement and disintegration of the great German war machine. And this was just the plain advertising of the facts; and it is well right here to remember that the propaganda which was used by the Allies had the same foundation and the same ideal as the motto adopted by the Associated Advertising Clubs of the World. The statements made were true statements; nothing but truth was used. The German prisoners captured with their pockets full of the leaflets prepared by the Allies believed their contents: there was a ring of truth which was not present in the German propaganda which had been carried on no less in Germany than in this country and throughout the world.

Sometimes I feel we are just on the eve of still greater developments in advertising than we have seen in the past, especially with respect to the advertising of opinions on public questions. The last Presidential campaign saw national advertising used for the first time by both large political parties. Full pages and double pages, and even larger spaces, were used in order to put the facts and figures and arguments before the voters of the country.

Only Safe Way to Influence Public Opinion

This is advertising directed to the influencing of public opinion, and that is the kind of advertising which public service corporations most need. The only safe way to influence public opinion is to put before the public frankly and fully facts, figures and reasons for business needs and business policies, and then to let the reader form his own opinion as to what is right and just. In my opinion it is not safe to argue with the reader, but rather to present facts.

Advertising has revolutionized our methods of marketing. It is almost wholly responsible for the rise of package goods, which have so largely taken the place of the old-fashioned bulk distribution. Advertising is called upon to change fashions. I believe it is responsible for the average well-dressed appearance of the American public, upon which European visitors never fail to remark. There are those who hold that the advertising of safety razors and shaving soap is directly responsible for the smooth-shaving habit of the American man. And so we could go on indefinitely multiplying examples of what has been done in the way of national advertising.

Need in the Gas Field

Now, in my opinion, gentlemen, there is a real need for national publicity by the American Gas Association. Why, the very integrity of the investments in public service corporations is being attacked. I am continually receiving circulars warning people not to invest in the securities of public service corporations. And yet we all know that we are engaged in the most stable business in the world, and that all we need to preserve our investments is for the public at large, whom we serve, to understand our problems; for the American public is, after all, willing to treat the public service corporations fairly.

There is another reason why I think you need this national publicity. That reason is to be found in the recent report of the advertising and publicity committee of the New England section of the National Electric Light Association, which I dare say you have all seen. From that report I should judge that your competitors would soon be engaged in a campaign of national publicity.

Gentlemen, it is high time that the people of the world came to a realization of the tremendous scope of the advertising business of to-day. No longer is advertising to be considered as a superficial gloss upon business. It rather has to do with the very fundamental principles of every business. There is co-operation in this age—yes; but in order to share in the benefits of co-operation every business man must co-operate. He must join this great university. He must adopt the best method for the diffusion of knowledge concerning his business. He must embrace the ideal—TRUTH.

Gas Main Precautions in Paris During Air Raid Period

Pipes Rendered Accessible forPlugging by Shafts Driven at Intervals Up to 650 Yards

After a fire caused by a bomb breaking a 12-in. main, the Paris Gas Company took steps to enable them rapidly to isolate any such breakages. At first it was suggested to put in manholes which would enable the mains to be got at and immediately plugged by bags. This was, however, too big an order to execute throughout the 675 miles of mains, from 40 in. down to 1.6 in. diameter, which would have required 15,000 manholes at least. They therefore restricted themselves to the high-pressure feeders and the leading mains and also to certain mains under 12 in. which were laid under cement or the like and would be difficult to get at when the occasion called for it.

In the high pressure feeders provision had already been made at intervals of from 162 to 330 yards, when the feeders were first laid; and shafts were opened up to render these arrangements accessible at short notice. The shafts were timbered and so far closed up as to allow the street traffic to be resumed. There were 68 of these shafts on a length of 25 miles; and there were 30 more points of ready access to the feeders.

To control the mains down to 12 in., mostly in bituminized iron, 610 shafts had to be sunk at distances up to 650 yards. These again were timbered and temporarily covered over. At the bottom of each shaft the pipe lay nearly pierced. It was thus possible to isolate a section at very short notice and to plug the smaller mains leading from it. Then plugging could be done more at leisure in the immediate neighborhood of the point of injury to the main. As to the smaller pipes under cement these were rendered accessible at 142 points.

In July, 1914, there were 69,541 burners used for public lighting, of which 4,975 were high-pressure burners; by April, 1915, these had been reduced to 21,312. The arc lamps in the same period had been reduced from 2,166 to 81. In consequence of air raids, most of the lights were put out at 10 p. m., leaving only 7,160 ordinaries, which were opaquely capped, and 734 high-pressure burners, which last were left without caps because they could be promptly extinguished in case of alarm. During the subsequent period the lighting was slightly increased, but at the end of 1917 blue chimneys were put in or blue paint was used on all the public lamps.